THE INDUSTRY'S RECOGNIZED AUTHORITY

ROCK PRODUCTS

JULY 1944

CEMENT · SAND AND GRAVEL · CRUSHED STONE · SLAG · LIME · GYPSUM
READY-MIXED CONCRETE · CONCRETE PRODUCTS · INDUSTRIAL MINERALS

JUL 20 1944

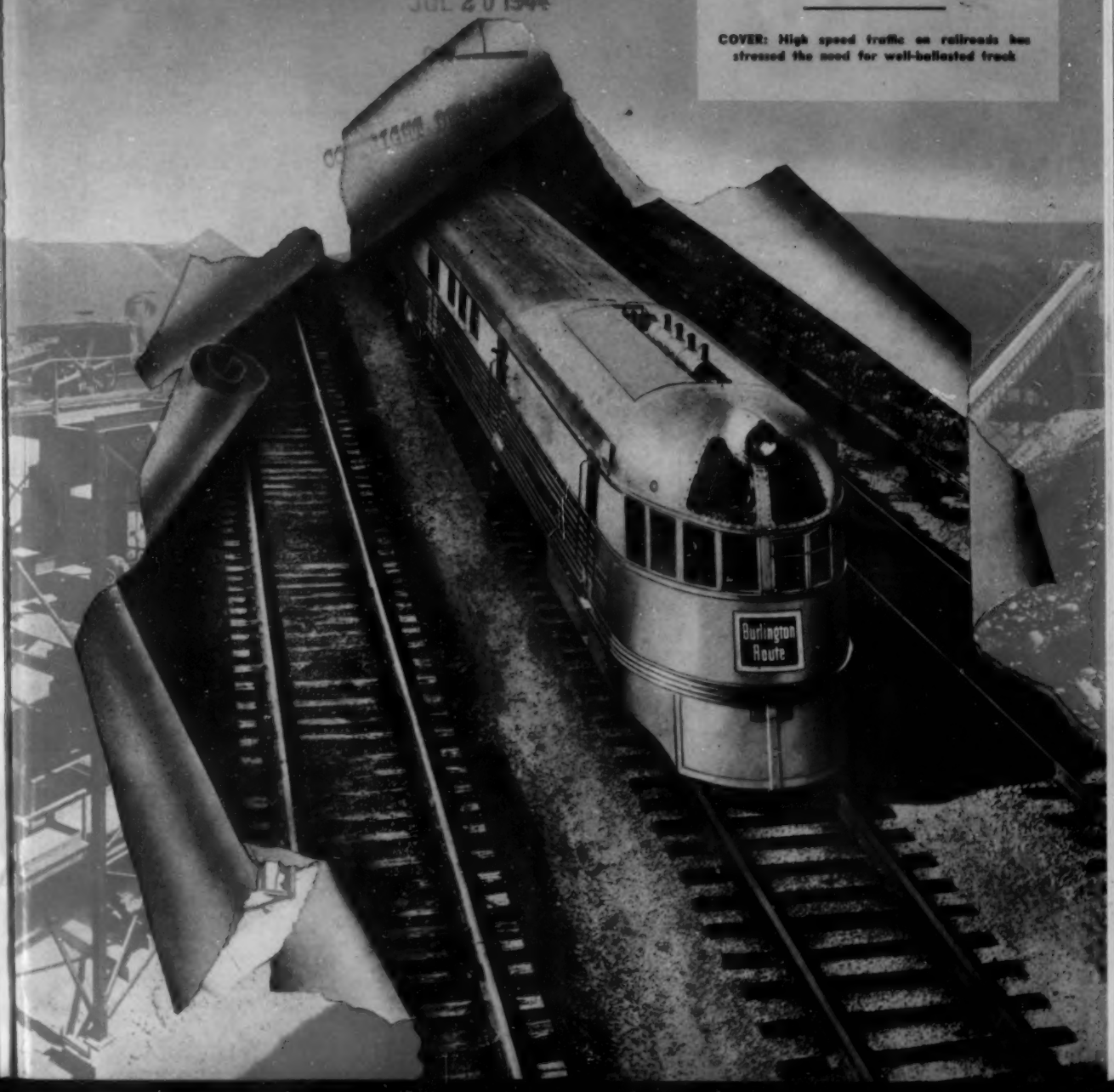
NEW BALLAST SPECIFICATIONS

CEMENT PLANT MAKES "BONE MEAL"

INDUSTRIAL SAND CONVENTION

MARKET FOR CONCRETE CRIBBING

COVER: High speed traffic on railroads has stressed the need for well-ballasted track

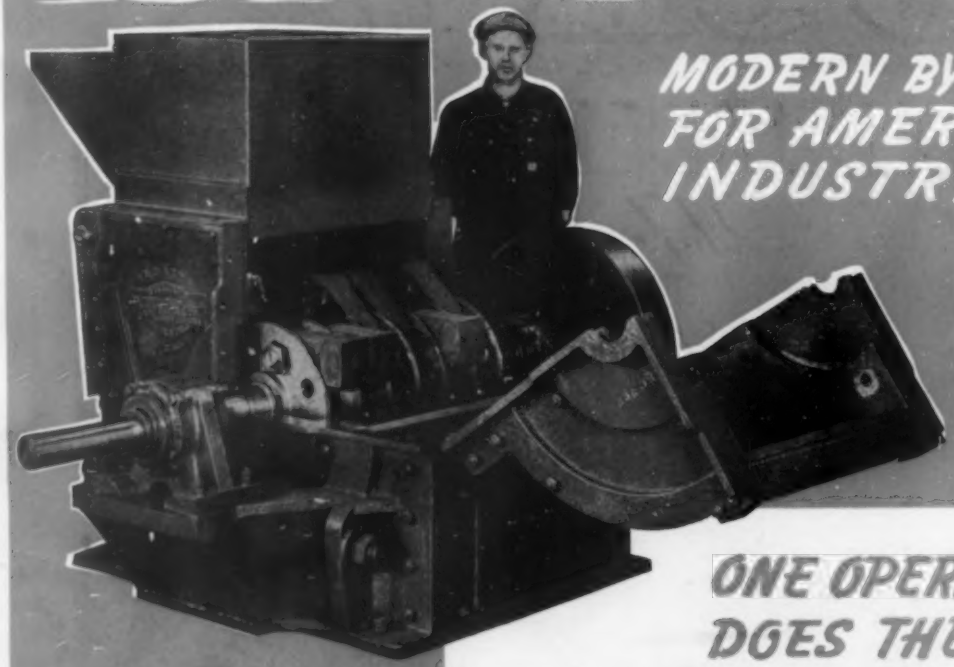


JUL 20 1944

TN950
A3

SPEED

MODERN BY-WORD FOR AMERICAN INDUSTRY.....



Open view of the Williams "Slugger" Crusher showing heavy duty hammers, liners and discs.

ONE OPERATION DOES THE JOB

SPEED plus satisfactory work is essential in America today. Along these lines the Williams "Slugger" Crusher and Pulverizer now makes it possible to crush large pieces of stone weighing from 75 to 100 pounds to 1¼", ¾" or agricultural limestone in One Operation. This not only eliminates costly sledging but also does away with the unnecessary expense of a primary crusher.

The "Slugger" represents the most advanced type of crushing equipment on the market today, and with seven sizes to choose from, producing from 4 to 30 tons per hour, every producer whether large or small can now afford to install a Williams.

Outstanding "Slugger" Features

- **MANGANESE STEEL HAMMERS.** Heavy Duty Slug End Hammers are standard equipment in the "Slugger."
- **HAMMER ADJUSTMENTS OVERCOME WEAR.** Discs are arranged so that the hammers can be set out as they wear on the end.
- **MANGANESE STEEL ADJUSTABLE BREAKER PLATE.** Adjustable towards the hammers.
- **ELECTRIC STEEL FRONT END.** The part which holds the breaker plate is electric steel casting—3½ times stronger than cast iron.
- **COVER LINERS 1" THICK.** Manganese steel liners.
- **SIDE LINERS 1" THICK.** Manganese steel liners.
- **SEVEN SIZES.** 30 to 150 horse power, stationary or portable models.

THE WILLIAMS PATENT CRUSHER & PULVERIZER CO.

800 ST. LOUIS AVE. ST. LOUIS, MO.

WILLIAMS FINE GRINDING EQUIPMENT WITH AIR SEPARATION

For faster, more efficient fine grinding of limestone, lime, coal, talc, etc., there is a Williams Roller Mill with Air Separator to fit your requirements. Finenesses from 100 to 400 mesh.

Williams also builds Impact Mills with Air Separation; Mechanical Air Separators for classifying finely ground material or taking the fines out of dry material.

★

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Williams

PATENT CRUSHERS GRINDERS SHREDDERS

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1122
Part 10

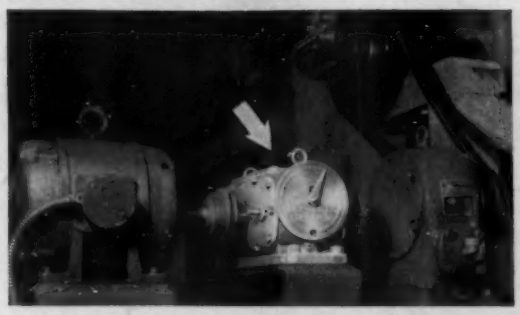
109

LINK-BELT

MATERIALS HANDLING AND POWER TRANSMISSION MACHINERY

SERVES THE ENTIRE INDUSTRY

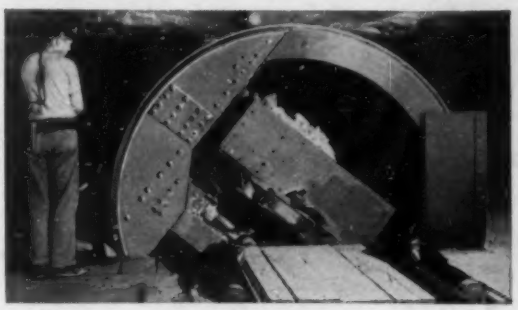
BELT CONVEYORS perform a very important job at this mine in keeping zinc-lead ores "on the move." Link-Belt designs offer the best in belt conveyor equipment.



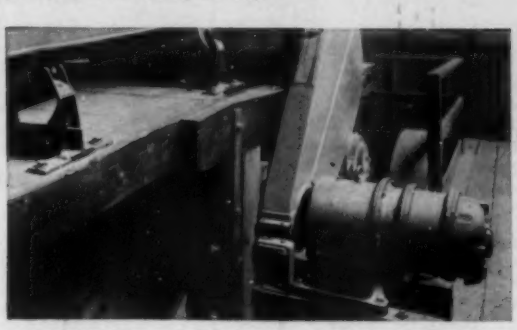
P.I.V. GEAR VARIABLE SPEED CHANGERS accurately control speeds of conveyors, feeders, ball mills, etc.

VIBRATING SCREENS assure high efficiency and low-cost operation on both liquid and dry screening applications.

SORTING-TABLE FEEDER-CONVEYOR handling ore from mine to crusher—one of the many types of Link-Belt Feeders in service in the mining industry.



ROTARY MINE CAR DUMPER on 900-ft. level dumping a 6-ton ore car into bin over primary crusher.



MOTORIZED SPEED REDUCER and **ROLLER CHAIN DRIVE** operating head shaft of belt conveyor.

LINK-BELT EQUIPMENT INCLUDES: Complete Sand, Gravel and Stone Washing Plants . . . Ready-Mixed Concrete Plant Equipment . . . Lime Handling Equipment . . . Screens (vibrating, rotary and conical) . . . Washers and Classifiers, of the screw, log, flight, Shaw and conical types . . . Dewatering Rotoscoops and Screw Conveyors . . . All Types of Elevators and Conveyors . . . Roto-Louvre Dryers and Coolers . . . Skip Hoists . . . Car Spotters and Haulage Systems . . . Portable Conveyors and Bucket Loaders . . . Silent and Roller Chain Drives . . . Speed Reducers . . . Variable Speed Transmissions . . . Chains (Malleable Iron, Promal and Steel) . . . Sprockets . . . Elevator Buckets . . . Gears . . . Clutches . . . Couplings . . . "Friction Fighter" Self-Aligning Ball and Roller Bearing Units . . . Babbitted Bearing Units, etc.

As specialists in the design, manufacture and application of materials handling and power transmission machinery for all industry, Link-Belt engineers have learned how to apply an extensive knowledge and experience, effectively, to the solution of all kinds of materials handling and power transmitting problems. Because Link-Belt makes many types of conveyors, chains and power transmitting machinery, we can be of incalculable service in recommending the equipment most certain to aid in attaining efficient production.

LINK-BELT COMPANY Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Dallas 1, Minneapolis 5, San Francisco 24, Toronto 8. Offices in principal cities.

SLINGS CAN'T SLIP OFF!

Laughlin Safety Hooks have a unique latch designed to prevent loads from slipping or jolting off the hook.
Green workers can work with less fear of accidents . . . older hands will appreciate this safety feature.
Laughlin's Safety Hooks are made of heat-treated, drop-forged steel.

OTHER LAUGHLIN FITTINGS

Laughlin offers you the most complete line of hoist hooks on the market, and there are standard Laughlin fittings for almost any other requirement.

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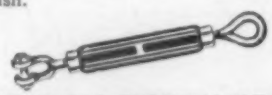
Rope sockets of drop-forged steel are available in sizes ¼" to 1¾" (open pattern) and sizes ¼" to 1¾" (closed pattern), plain or galvanized finish.



WELDLESS TURNBUCKLES

Weldless Turnbuckles are available in all types and sizes from ¼" x 4" to 2½" x 36". The largest turnbuckle ever made by drop-forging was produced by Laughlin . . . a giant of 440 pounds for a 50 ton boom.

Laughlin's latest catalog shows the complete line of Laughlin Wire Rope Fittings. Send for it.

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IN OPEN-PIT MINES AND QUARRIES

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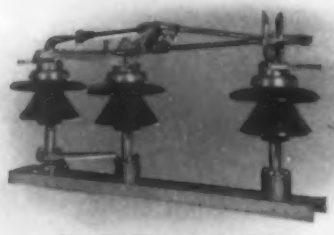
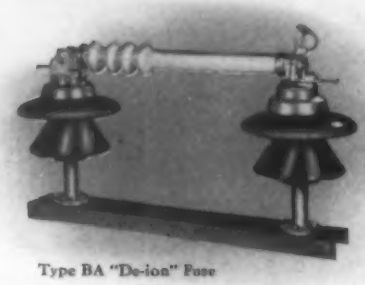
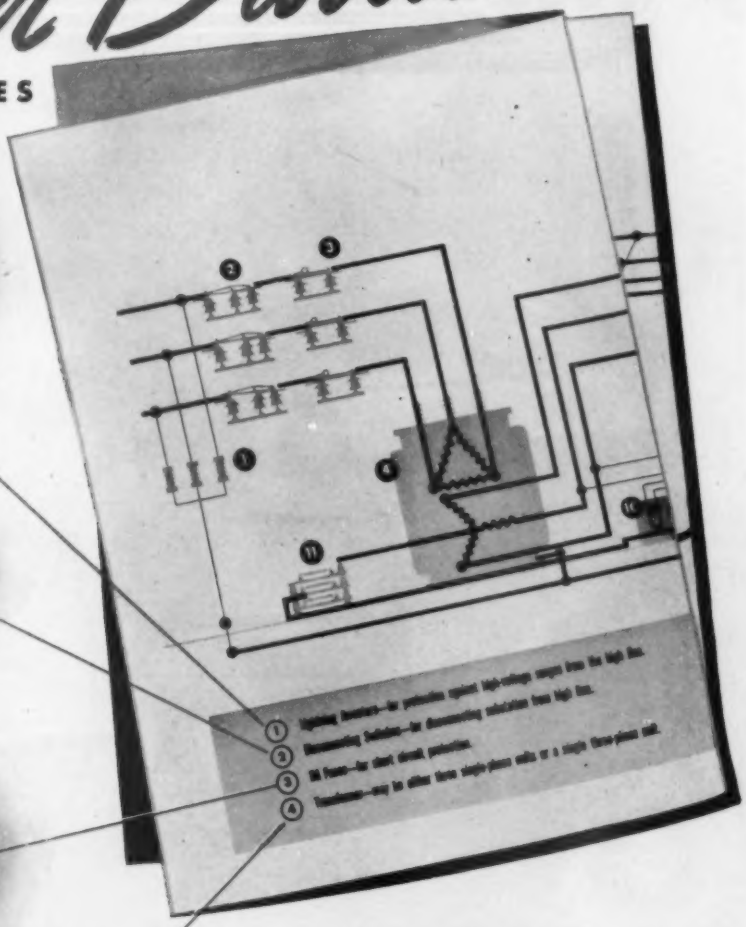


Type KA Disconnecting Switch



Type BA "De-ion" Fuse

Type SL Distribution Transformer (single-phase).



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A typical example of B. F. Goodrich product development

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Then a thermostat manufacturer developed a control that he was sure would do the job. But his design called for rubber parts that would be unaffected by oil; that could stand being forced against metal repeatedly at high pressures; that wouldn't be affected by high temperatures for long periods yet would remain flexible at 65 degrees below zero. Such a compound had never before been made. But B. F. Goodrich research men, starting with a synthetic rubber that resisted oil, developed a compound with all the other needed characteristics. Made into precision parts for the new thermostat, it performed perfectly; another B. F. Goodrich development for war that will have useful and important peacetime applications. *The B. F. Goodrich Company, Industrial Products Division, Akron, Ohio.*

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Even with the greatly expanded construction equipment industry producing FOUR TIMES its pre-war rate . . . there is still a serious shortage of construction equipment. Nearly all new machines go directly to our armed forces overseas, even a large number of used outfits. As military operations expand, and additional territory is reclaimed from the Axis, more and more will be needed. Besides this — vital industries are in desperate need of tractors, graders, shovels, cranes and other units.

Here is a chance to actively support the war effort — rent or sell idle machines to essential users. Apply for authorization at your nearest WPB office . . . or make the deal through your Allis-Chalmers dealer. He will buy your equipment and see that it is directed into war work. No authorization is required on sales to dealers.

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*H. M. Hale, Director of WPB Construction Machinery Division, Equipment Bureau.

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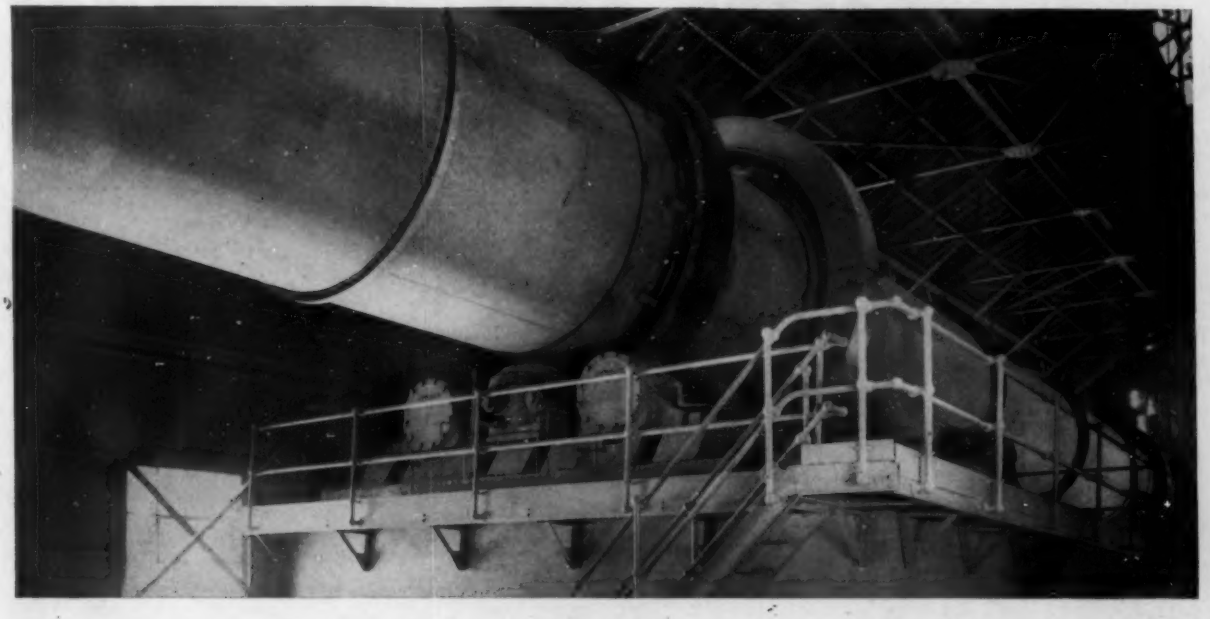
Rotary Kilns



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By our original and constantly improved methods the edges of the plates forming the complete shell are so thoroughly fused that the joints are stronger than the parent metal. And smooth, too—in fact, if the surfaces were to be machined it would be difficult to see the joints.

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As a result, Traylor Rotary Kilns—and Traylor Rotary Coolers and Dryers, too—have come to be recognized as units that can be completely relied upon, by the engineers and operators of cement and lime manufacturing plants, chemical plants, mining plants, and other process industries.

We invite engineers and operators who do not know Traylor Rotary Kilns, Coolers and Dryers to use our facilities for help and advice. Write us, today!

SEE OUR BULLETIN No. 115

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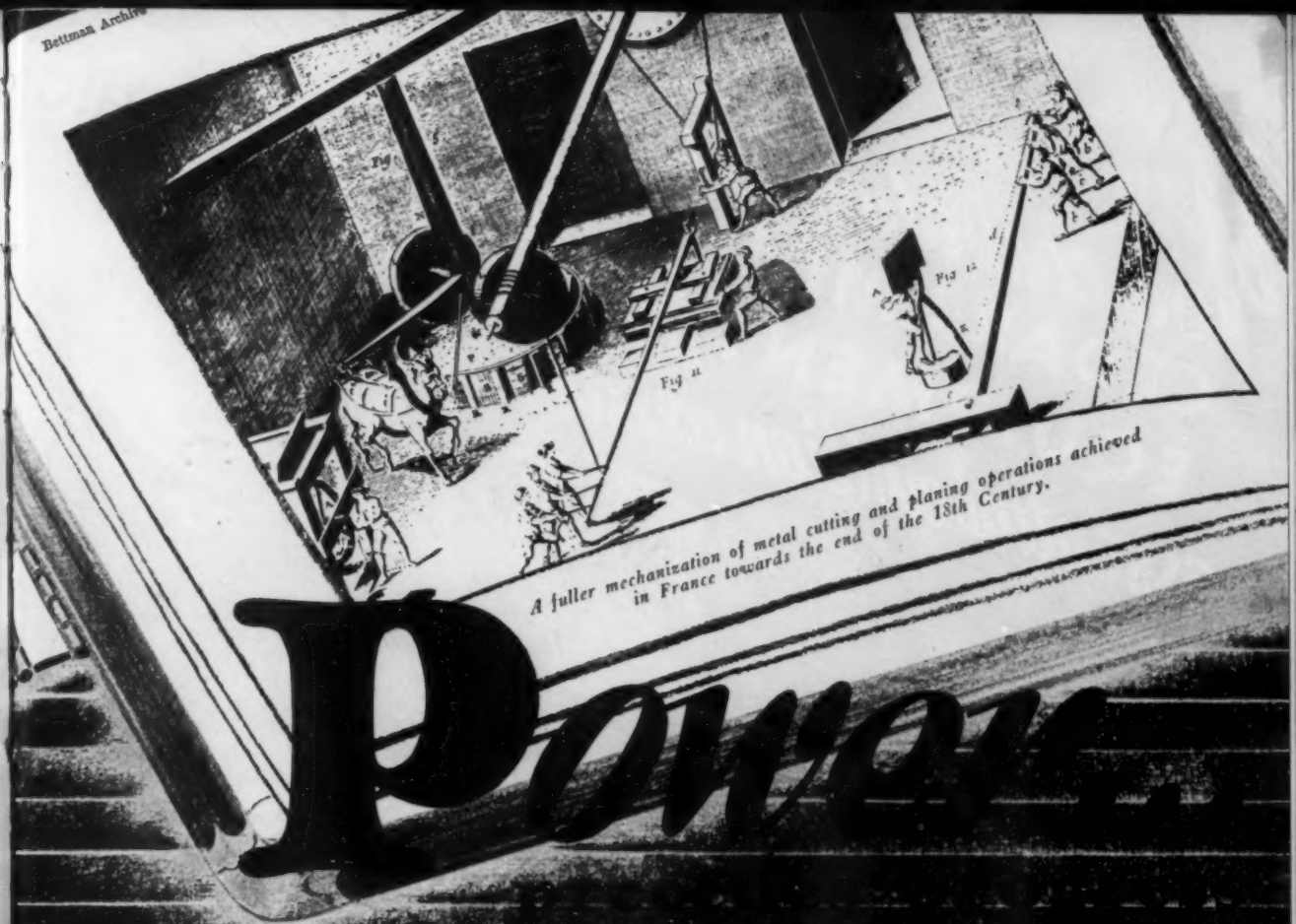

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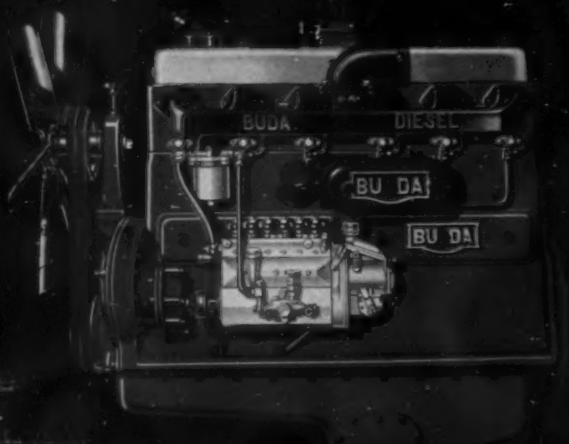

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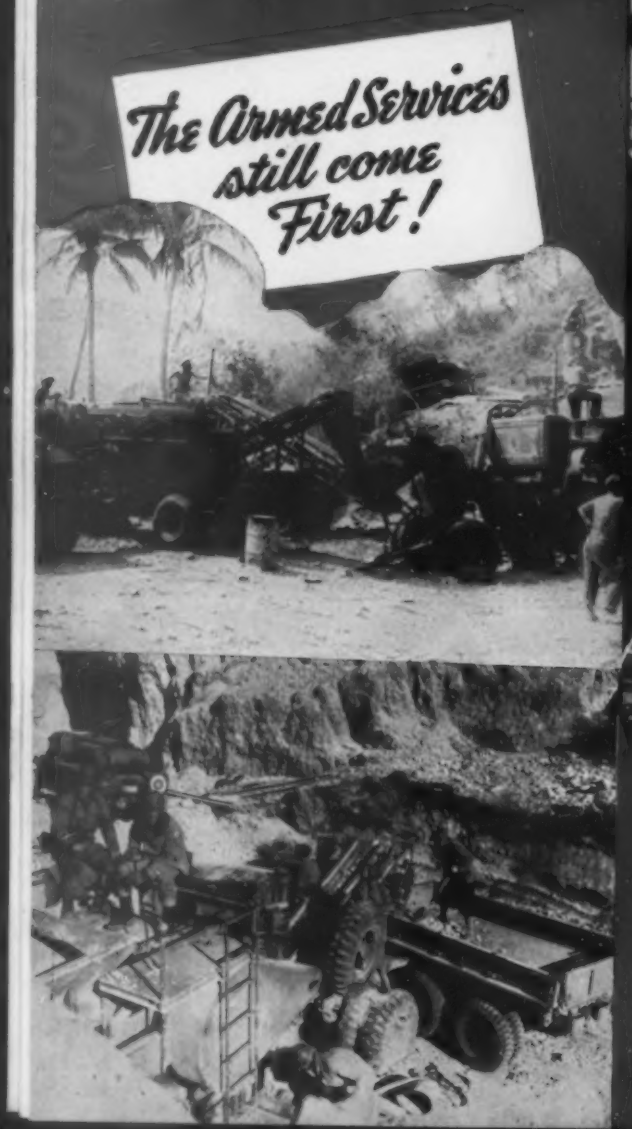

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of Material Handling Equipment includes

- Rock and Gravel Crushers
- Belt Conveyors - Steel Bins
- Bucket Elevators
- Vibrator and Revolving Screens
- Straight Line Rock and Gravel Plants
- Feeders — Traps
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- Portable Stone Plants
- Portable Gravel Plants
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- Traveling (R... Plants
- Drag Scraper T...
- Washing Plants
- Tractor-Crusher
- Steel Trestles and
- Rubber Impact R...

EVEN THOUGH we're still making aggregate plants for the Army, Navy and for Lend-lease we can accept your orders for more Cedarapids crushing and asphalt equipment. Only the usual releases and priorities are necessary. Just tell us your needs and we'll help you with the priority forms and engineer the equipment to fit your requirements.

Manufacturing facilities and engineering skill which produced and are producing aggregate plants for war use, at such an unprecedented rate, can also be used for essential civilian production. The performance of Iowa plants in producing the aggregates which made America strong means lower cost and better performance on your contracts for highways, airports, dams, and other construction.

The Cedarapids line is complete and will meet any aggregate production problem either from the standpoint of output or character of materials for either an entire plant or a single piece of equipment.

Be sure you come to headquarters for aggregate producing equipment first. See your Iowa dealer or write direct.

Cedarapids

Built by IOWA

ARMY E NAVY

IOWA MANUFACTURING COMPANY

Cedar Rapids, Iowa

Agstone AND ROAD AGGREGATES . . .

TELSMITH

PLANT *flexibility* PRODUCES ALL WANTED SIZES

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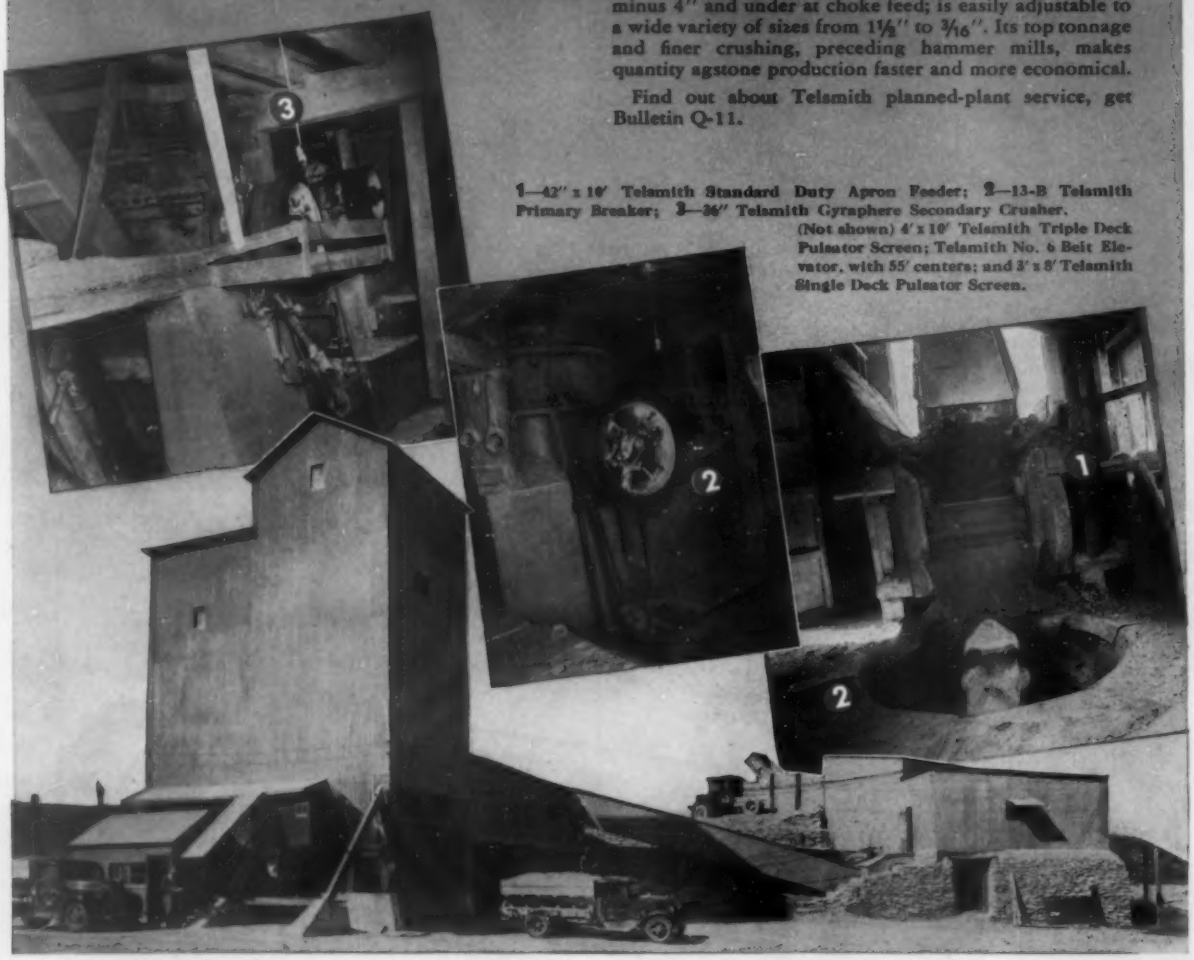
Telsmith engineers co-operated with them in designing this plant—co-ordinating and balancing its Telsmith machinery to turn out agstone as required *and* in addition, four finished sizes of road stone for surrounding counties and municipalities. Average production is 80 t.p.h. of various sizes.

The speed, large capacity, and wide range of accurate sizes turned out by Telsmith crushers give this plant its remarkable flexibility. The 13-B Telsmith Primary Breaker handles 13" to plus 4" rock; minus 4" is bypassed. Telsmith Gyrasphere Secondary Crusher takes minus 4" and under at choke feed; is easily adjustable to a wide variety of sizes from 1½" to 3/16". Its top tonnage and finer crushing, preceding hammer mills, makes quantity agstone production faster and more economical.

Find out about Telsmith planned-plant service, get Bulletin Q-11.



1—42" x 10' Telsmith Standard Duty Apron Feeder; 2—13-B Telsmith Primary Breaker; 3—36" Telsmith Gyraphere Secondary Crusher. (Not shown) 4' x 10' Telsmith Triple Deck Pulsator Screen; Telsmith No. 6 Belt Elevator, with 55' centers; and 3' x 8' Telsmith Single Deck Pulsator Screen.

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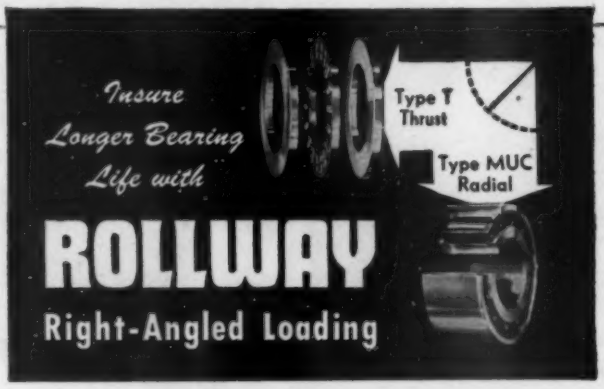
Down-time for repairs! Skilled labor standing idle! Valuable manpower diverted to unproductive maintenance! They're serious problems today, but they'll be worse when war contracts vanish and you're fighting hard for every order.



RADIAL
THRUST
Follow This Basic Bearing Principle:—
● All radial loads carried at right angles to the roller axis.
● All thrust loads carried at right angles to the roller axis.
● All compound loads carried on separate radial and thrust bearings — used in combination — as shown in the diagram.

. . . So start today. Engineer both *your product* and *your production machines* for minimum maintenance. Check every bearing . . . its life expectancy . . . the average number of hours lost through servicing and replacement . . . the ruggedness and compactness of the housing . . . and the power that could be saved through high-efficiency bearings. Then consider how Rollway's Right-Angled Loading would help you.

Right-Angled Loading Reduces the Unit Load

The advantages of Rollway's basic bearing principle can be seen at a glance: Every radial load is carried at right angles to the roller axis. Every thrust load is carried at right angles to the axis of a separate set of rollers. That means the total load is split into two simple components. The unit load per roller is lower. There are no oblique resultants tending to pinch the rollers out from between the races. Roller-end wear-back is reduced. Rubbing or sliding friction is practically eliminated. Starting torque is lower. Bearing life is longer. And the end result is a noticeable reduction in maintenance.

LET US HELP YOU SELECT THE PROPER BEARINGS FOR YOUR NEEDS

The life of a bearing is not measured entirely by its size, material or precision workmanship. Suitability for the work *is* an important factor. Let our engineers help you select from the wide range of SAE and American Standard metric sizes. Just send a drawing or detailed description for confidential analysis and recommendation. No charge or obligation.

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BUILDING HEAVY-DUTY BEARINGS SINCE 1908 — BEARINGS

The LATEST in
SCIENTIFIC LIME PRODUCTION

• For the Large Producer

• For the Small Producer

. . . . for the Large Producer . . . . . .

KENNEDY STONE PREHEATER and DEHEATER

Just as the Army Air Corps uses a different type plane for its numerous and varied missions, we offer a lime manufacturing unit best suited for the large scale producer and one for his small-volume counterpart. Both produce the best grade of lime and do it most economically in their volume range.

- 20% INCREASE IN CAPACITY
- 40% SAVING IN FUEL
- A BETTER PRODUCT

The KENNEDY Preheater and Deheater provides a complete answer to the lime producers who want to combine the superior product of a rotary kiln with the operating economy of a vertical kiln.

This equipment effects a partial calcining of the material, thereby reducing kiln wear and kiln lengths. It recovers and utilizes exit gases, and has proved so efficient in actual operation that 40% fuel savings and increased output exceeding 20% have been recorded. At the same time a better quality of lime has been obtained.

Short kilns employing the Kennedy method also acquire an internal glaze which lessens the wear on kiln liners, lowers the power requirements, and reduces formation of kiln rings. Overburned and underburned lime is practically eliminated. Coal feed and lime calcination are switchboard controlled.

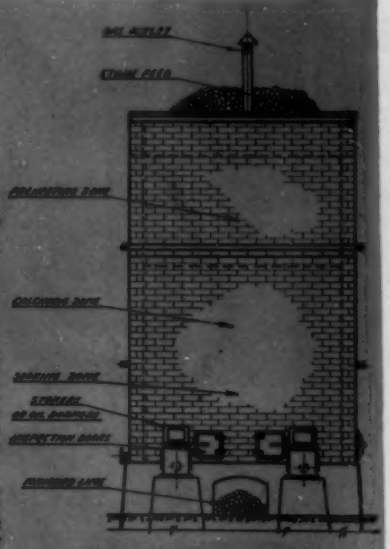
Write for descriptive literature

. . . . . for the Small Producer . . . . . .

KENNEDY VERTICAL CONTINUOUS DISCHARGE KILN

If your lime market is too small to warrant a Preheater and Rotary Kiln installation you can produce a better grade of lime five to ten tons daily with the Kennedy Vertical Continuous Discharge Kiln. It has a lower power requirement, high thermal efficiency and produces a high quality product.

The kiln is designed to calcine stone ranging in size from ¾" to 1¼", thus utilizing what would ordinarily be waste for the old type vertical kiln. Simple to erect and to operate. The fuel is thermostatically controlled, making the kiln practically automatic. It discharges continuously, eliminating overburned or underburned lime.



This kiln will have a capacity of approximately 10 tons per day of 24 hours.

We have a very large line of mining, crushing, cement, lime-burning and pulverizing equipment, and pulverized coal equipment. If interested write for special bulletins.

KENNEDY-VAN SAUN MFG. & ENG. CORPORATION

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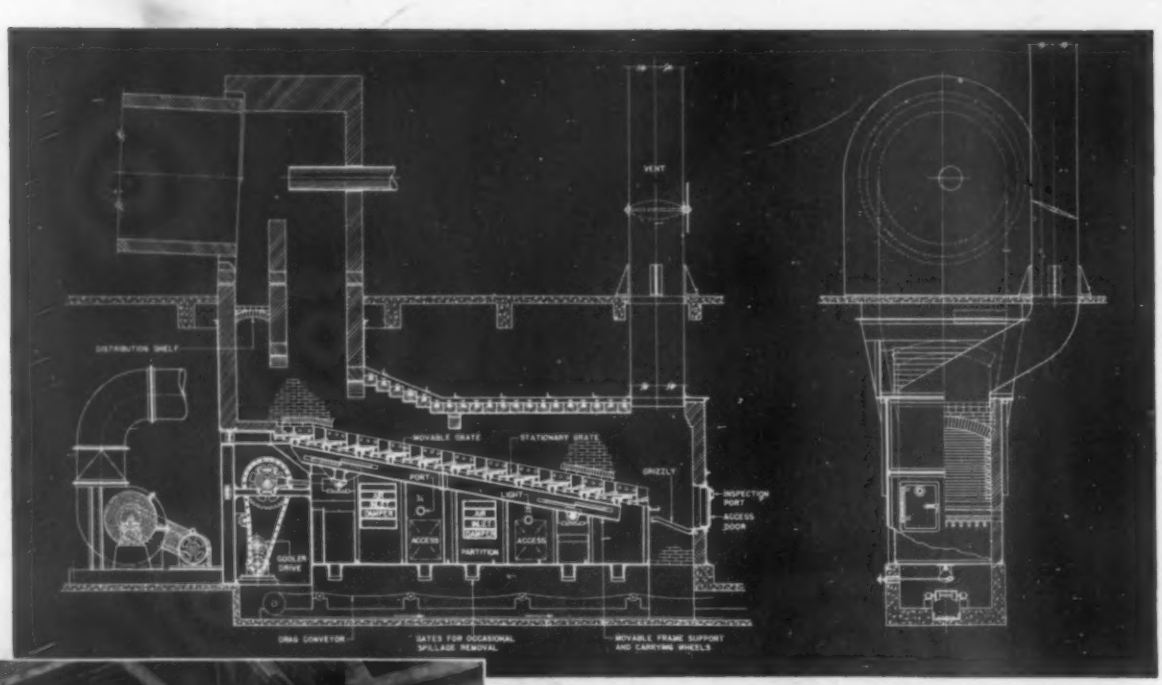

Fuller Coolers Will do the Job Better . . .

Satisfactory performance of initial installations has resulted in many repeat orders . . . proof that Fuller Coolers do the job better . . . that they do everything claimed for them, meeting the exacting approval of the chemical and operating departments of the many companies making these installations.

Since the first trial unit proved successful, sales have consistently mounted, until today more than 100 have been sold. And, of this impressive total, 23 have been repeat orders.

Our engineering department is now in a position to make studies of your requirements. Why not act now . . . be prepared to install Fuller Coolers at the first opportunity.

FULLER COMPANY

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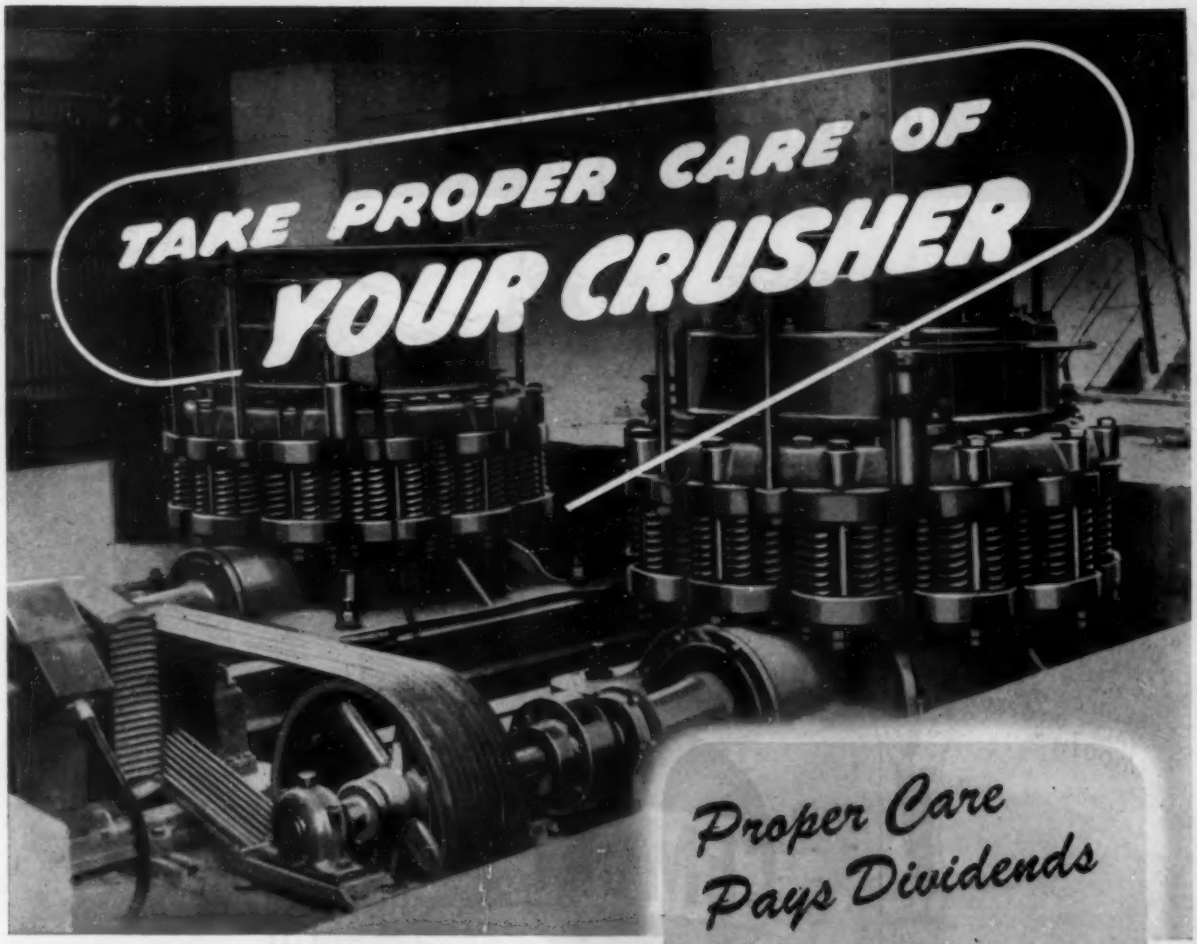
FULLER-KINYON, FULLER-FLUXO AND THE AIRVEYOR CONVEYING SYSTEMS . . . ROTARY FEEDERS AND DISCHARGE GATES . . . ROTARY AIR COMPRESSORS AND VACUUM PUMPS . . . AIR-QUENCHING COOLERS . . . DRY PULVERIZED MATERIAL COOLERS . . . MATERIAL-LEVEL INDICATORS . . . SLURRY VALVES



NOW more than ever before, crushers are being operated under forced conditions brought on by war. Often the crusher is badly overloaded because of production demands. Operating periods are longer. There is less opportunity for shutdowns for inspection and repair. Such conditions contribute to reduction of output, loss of crusher efficiency and increase in maintenance expense.

While the Symons Cone Crusher is designed to operate under extreme conditions, it cannot be expected to withstand continued abuse and neglect. Take care of your crusher and it will pay dividends in more satisfactory performance and greater profit returns.

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Proper Care Pays Dividends

Follow these suggestions and get better service from your SYMONS CONE CRUSHER

★ DON'T OVERLOAD

★ FEED PROPERLY

★ INSPECT REGULARLY

★ KEEP PARTS TIGHT

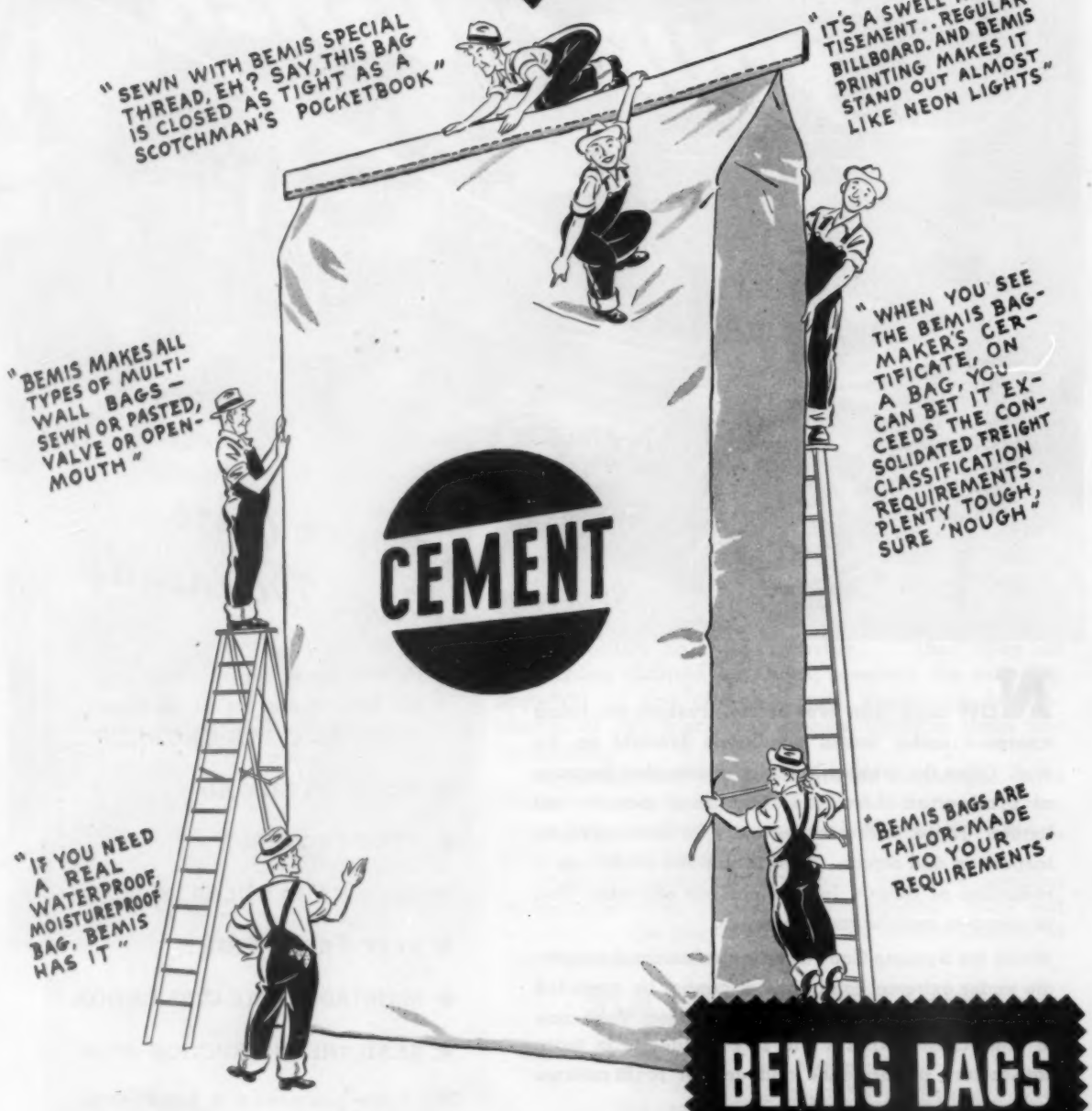
★ MAINTAIN AMPLE LUBRICATION

★ READ THE INSTRUCTION BOOK

We have prepared a booklet to aid you to properly care for your crusher. Write for Bulletin 116.

SYMONS CONE CRUSHERS

Bemis MULTIWALL PAPER SHIPPING BAGS . . .


"SEWN WITH BEMIS SPECIAL THREAD, EH? SAY, THIS BAG IS CLOSED AS TIGHT AS A SCOTCHMAN'S POCKETBOOK"
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Multiwall Paper, Waterproof Paper Lined, Cotton and Burlap Bags for Rock Products

"PEAK PERFORMANCE"

Handling approximately 300 tons of material per hour in an Ordnance Plant, this Primary Unit of an Austin-Western Twin-Unit Plant, with its 1036 Jaw Crusher, produced (in the pile at the right) pit fines to be used for secondary roads; and (in the pile at the left) minus 2″ crusher-run rock for base course. At the same time, the Secondary Unit, with its 4022 Roll Crusher, was 100 miles away, producing surfacing material for black-top roads. The two were demonstrating one of several reasons why the Twin-Unit type of Plant is the logical selection for many operators.

Each Unit of the Austin-Western Twin-Unit Plant is capable of producing material that meets the requirements of many jobs—and producing it more efficiently than would be possible with a two-crusher Plant. The complete Twin-Unit Plant, on the other hand, has a capacity and a variety of output far greater than that of any two-crusher Plant. Thus, for maximum output and variety of specification on the one hand, and maximum economy of operation on the other, the owner of a Twin-Unit Plant has the flexibility of operation that spells maximum profits.

AUSTIN-WESTERN COMPANY, AURORA, ILLINOIS, U. S. A.

BUILDERS OF ROAD MACHINERY
Austin Western
SINCE 1850
BUY MORE WAR BONDS

9 DR 30's on this JOB!

Pneumatic tires can be had if specified by purchaser in his application for priority to Construction Machinery Branch of War Production Board.

• Plenty of rock here! So husky, maneuverable Cleveland DR 30 Wagon Drills were used to good advantage at this large, west coast naval base.

Here are 7 REASONS why the DR30

IS THE MOST POPULAR WAGON DRILL EVER BUILT:

1. They drill at *any* angle and in *any* direction, flat holes from 4" to 8' aboveground, also straight up or down.
2. Feed capacity is over 8 feet, and the Cleveland DR 30 handles depths to over 25 feet.
3. The recoil device holds machine to its work, and increases the drilling speed from 10 to 25%.
4. Forward leg point holds the drill and steel in line whether operating in down, flat or angle holes.
5. Centralizer keeps steel from "walking" when starting hole, prevents breakage of bit points.
6. The twin jack-screw mechanism permits easy moving of U-bar, and also shortens set-up time.
7. The main wheels swivel 90° for line drilling, and 180° in order to obtain narrower tread.

Ask for Bulletin 132

BACK THE ATTACK—BUY MORE WAR BONDS

LEADERS IN DRILLING EQUIPMENT

THE CLEVELAND ROCK DRILL CO.

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The Greatest Forward Step in Electric Shovel Development

Here is a fresh concept in Electric Shovel Design.

Here, you'll miss much of the old conventional equipment—and many of the conventional sources of trouble. Here, for the first time on an Electric Shovel is the P&H Magnetorque Hoist Drive which does away with all friction clutches. Here also is the new Directron Control which eliminates all contactors — rotating regulators — exciters. It cushions all power impulses and reduces electrical equipment to a new minimum. Motors and generators are, for the first time, designed specifically for Electric Shovel operation.

There are many other advancements in this new P&H Electric Shovel such as independent propel drive, positive steering control, worm type crowd, and filtered air cab. Mining and quarrying men, interested in more digging time, in greater tonnage and lower costs, should write us for full particulars.

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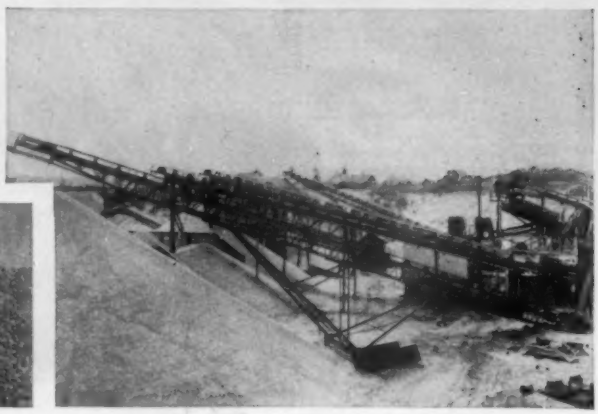


CUSTOM BUILT *with Standard Units . . . . .*

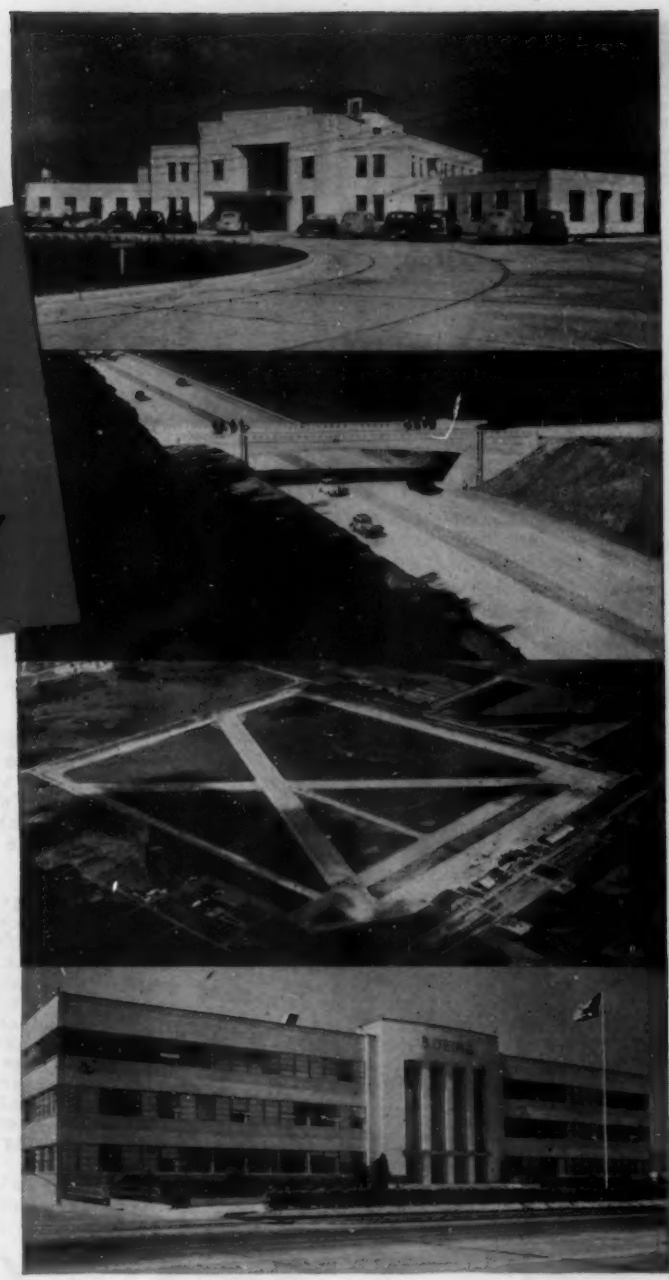
Typical of the Barber-Greene concept of Standardized Sectional Conveyor construction are the installations shown here. The belt conveyors used in these plants consist, for the most part, of standard units, pre-engineered and designed for production manufacture. These standard terminals, trusses, carriers, A-frame supports, and take-ups are available in a wide range of sizes and horsepower to meet a custom engineered application.

The Barber-Greene Engineering Department will assist you in utilizing this equipment to best advantage. It is equipment that can be expanded as your plant grows merely by adding standard units. Barber-Greene Co., Aurora, Ill., U.S.A.

44-26

BARBER-GREENE

AURORA, ILL., U.S.A.



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CEMENT and other rock products, important members of the ground crew, have reported "ready for duty" in Multiwall Paper Bags, and have speeded the completion of airfields, factories, hospitals, bridges, laboratories, and many other projects vital to the industrial and military prosecution of the war.

Multiwall Paper Bags are required for industrial shipments of food products, chemicals, fertilizers, and construction materials — for domestic use and overseas to our armed forces and civilian populations of allied nations and occupied countries.

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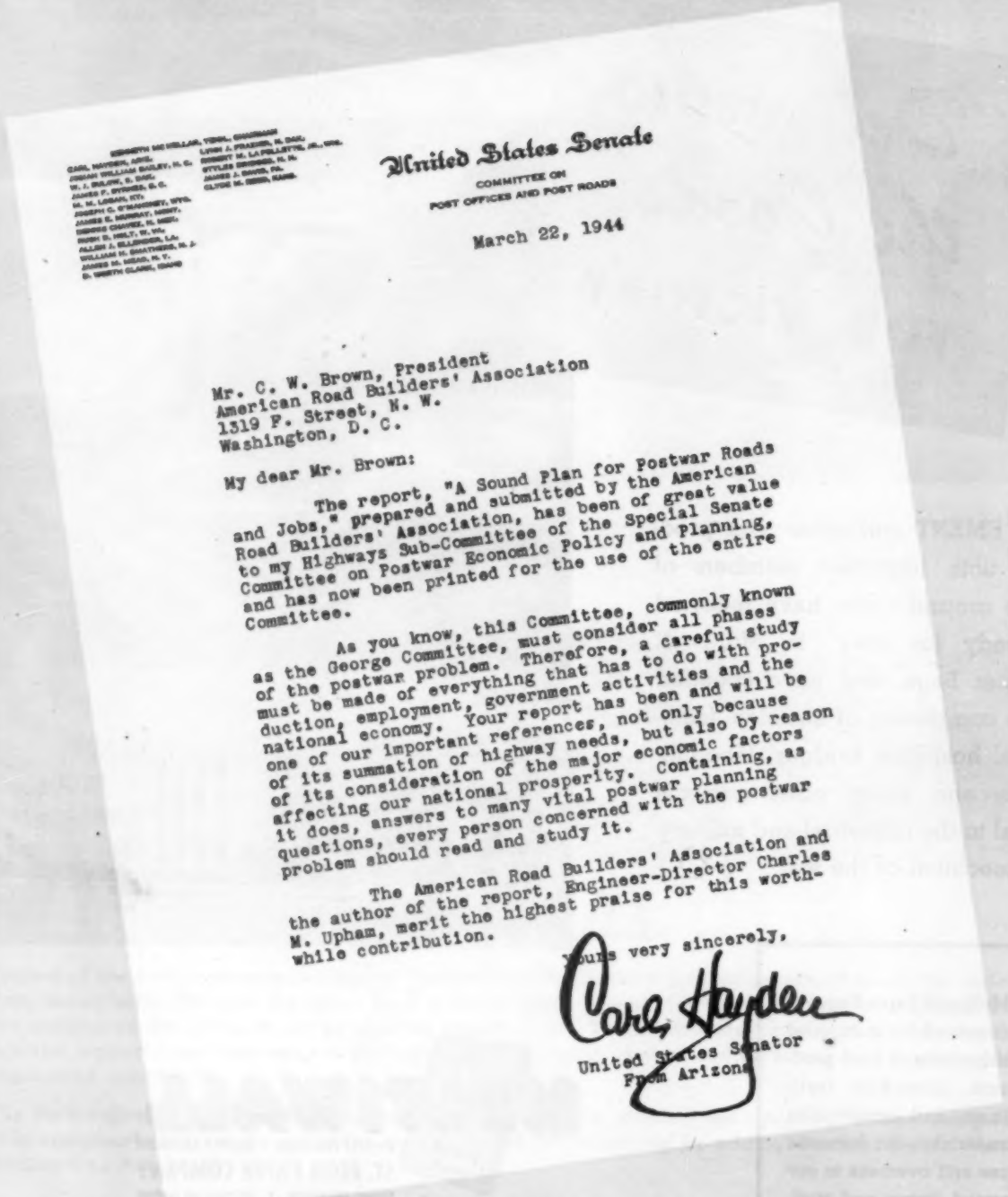
"EVERY PERSON SHOULD



United States Senate

COMMITTEE ON
POST OFFICES AND POST ROADS

March 22, 1944

Mr. C. W. Brown, President
American Road Builders' Association
1319 F. Street, N. W.
Washington, D. C.

My dear Mr. Brown:

The report, "A Sound Plan for Postwar Roads and Jobs," prepared and submitted by the American Road Builders' Association, has been of great value to my Highways Sub-Committee of the Special Senate Committee on Postwar Economic Policy and Planning, and has now been printed for the use of the entire Committee.

As you know, this Committee, commonly known as the George Committee, must consider all phases of the postwar problem. Therefore, a careful study must be made of everything that has to do with production, employment, government activities and the national economy. Your report has been and will be one of our important references, not only because of its summation of highway needs, but also by reason of its consideration of the major economic factors affecting our national prosperity. Containing, as it does, answers to many vital postwar planning questions, every person concerned with the postwar problem should read and study it.

The American Road Builders' Association and the author of the report, Engineer-Director Charles M. Upham, merit the highest praise for this worthwhile contribution.

Yours very sincerely,

Carl Hayden

United States Senator
From Arizona

THIS ADVERTISEMENT CONTRIBUTED TO
STIMULATE POSTWAR PREPAREDNESS

READ AND STUDY IT!"

Says U. S. Senator Carl Hayden, Chairman, Highway's Sub-Committee

When a Senator writes to urge everyone to get interested—that's news.

Senator Carl Hayden's letter reproduced on the facing page shows two healthy signs. It indicates that legislators appreciate the thoughts of the public on important matters. It also indicates that Senator Hayden and his Highway's Sub-Committee are on the job and looking ahead. This is indeed fortunate.

Every man, woman and child has an interest in the postwar highway building program. Good roads are a necessity, bringing countless benefits and savings to all. As a matter of fact, the economic structure of our country is built around the motor vehicle.

Many postwar plans will come before Congress. But that of the American Road Builders' Association is the first sound plan up for consideration which so greatly affects the prosperity of all without imposing a drain on the national economy.

The proposed highway program calls for an inter-regional system worked out by the American Association of State Highway Officials. Covering 34,000 miles, it will afford jobs for three million persons quickly. According to the U. S. Public Roads Administration, the three billion dollar annual budget proposed for it will eventually result in nine and one-half billion dollars in business transactions. Taxes and fees now levied for highways and streets, if used for the purpose, would eventually build and maintain the system.

What happens to the postwar highway building program will set a pattern, good or bad, under which private enterprise will function freely or otherwise.

Besides detailing a planned, plausible, postwar program, the book, "A Sound Plan", gives deep but comprehensive consideration to the major economic factors affecting our postwar prosperity. Read this book and we feel sure it will win your active support.

A Sound Plan
for Postwar
ROADS... and JOBS
Based on studies of prosperous periods and depressions, this plan provides for full employment, better transportation, and active markets, the essentials for a prosperous future.
FREE

Charles M. Upham, Engineer-Director
American Road Builders' Association
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Please send "Sound Plan" book Free.

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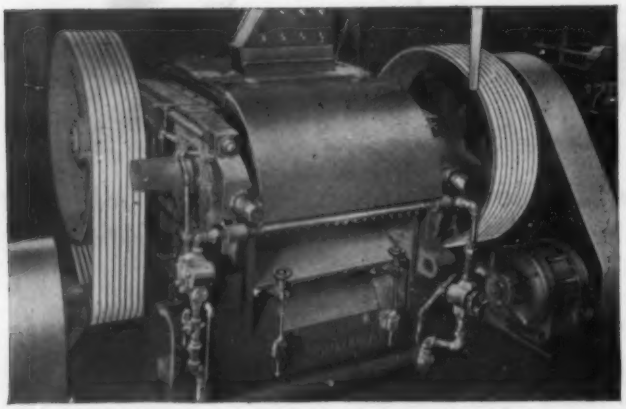

* **One TYPICAL EXAMPLE**

On these flaking rolls where gas flames create considerable heat, Gates V-belts of special synthetic rubber are used because of their proved ability to withstand bad heat and oil conditions. By actual records, on hundreds of installations where oil or heat conditions are severe, Gates special synthetic V-Belts are wearing 2 times to 3 times as long as any natural rubber belts ever used.

Through More Than 6 YEARS in Hundreds of Plants *

GATES *Synthetic Rubber* V-Belts

—Have Been OUTWEARING Any NATURAL Rubber Belts Ever Used!

Now that all industry depends on belts made of synthetic rubber, it is well worth-while to know that Gates Synthetic Rubber V-Belts have been in nation-wide use for more than 6 years—and *through all that time* they have been giving service actually *superior* to belts of *natural rubber!*

* **There are, of course, many kinds of synthetic rubber. Gates uses each kind where it best meets some particular service need.**

For example:—one special synthetic rubber which Gates uses extensively in making V-Belts has the ability to withstand oil and heat much better than natural rubber can. Where oil and heat conditions are especially severe, Gates special synthetic V-Belts are giving *3 times* to *4 times* the service life of *any natural rubber* V-Belts ever used.

This is the record not of a few belts over a limited period but of thousands upon thousands of Gates synthetic rubber V-Belts installed in hundreds of plants and factories during the past 6 years.

Gates long headstart in fabricating V-Belts of synthetic rubber is of greater importance to you now than ever before because *all* the V-Belts furnished industrial plants today are of *synthetic rubber.*

You will gain a distinct advantage in V-Belt service by simply picking up your telephone directory and calling the Gates Field Engineer. He will bring right into your plant the full benefits of Gates knowledge and experience without the slightest obligation.

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THE GATES RUBBER COMPANY

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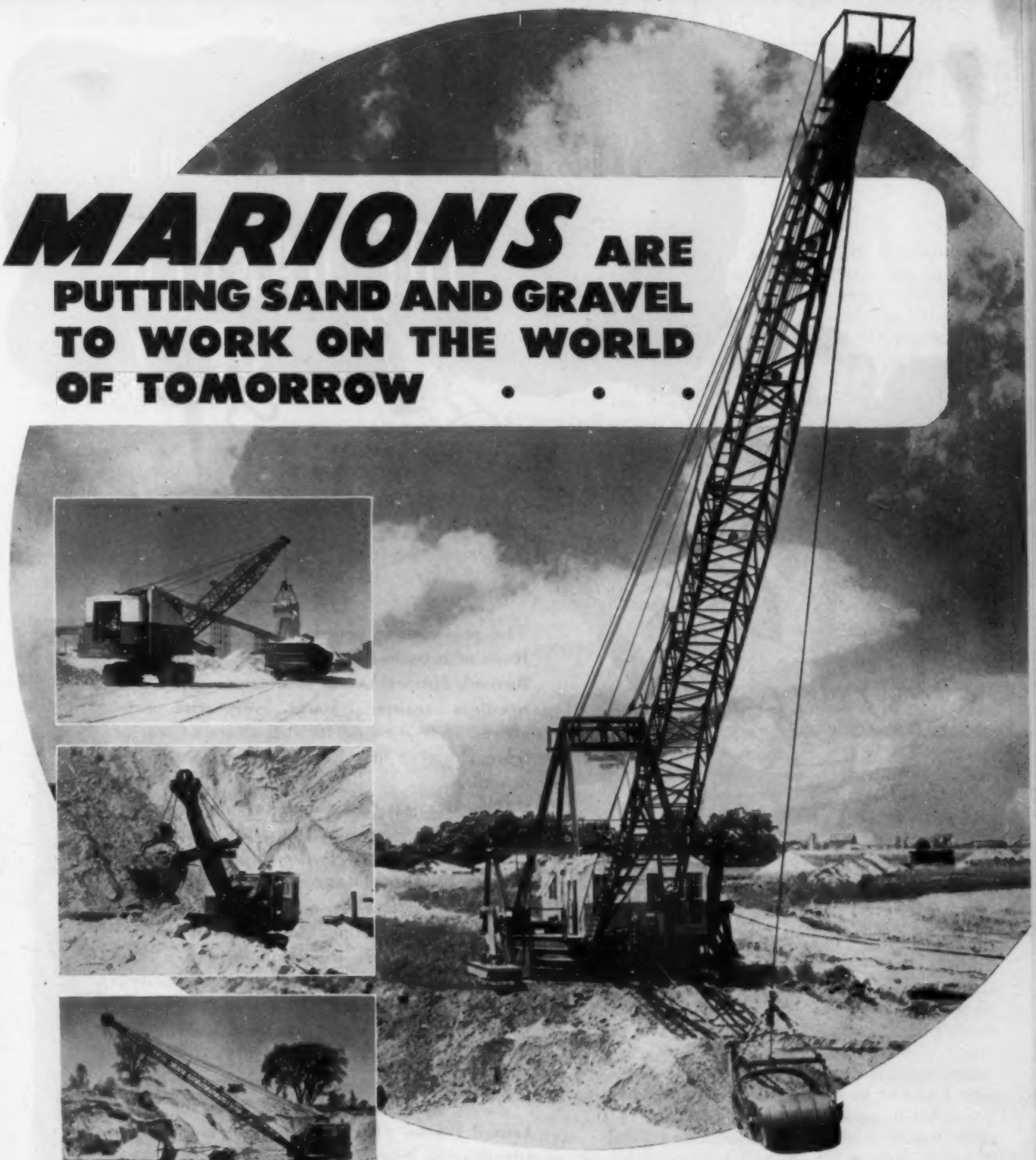
MARIONS ARE PUTTING SAND AND GRAVEL TO WORK ON THE WORLD OF TOMORROW . . .



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For Every Material Handling Job
3/4 cu. yd. to 35 cu. yds.

BUY WAR BONDS

Big plans for the future are being built around the Nation's store of sand and gravel. These plans call for MARION shovels, draglines and clamshells to play their usual leading role in the digging and loading of these aggregates faster and cheaper. New buildings, airports, super-highways, dams, harbor facilities and housing projects, which will comprise the world of tomorrow, will come into being through Marion's part in providing THE MACHINE OF TOMORROW to handle the necessary aggregates. What are your plans for post-war construction, mining or quarrying? Let's discuss them.

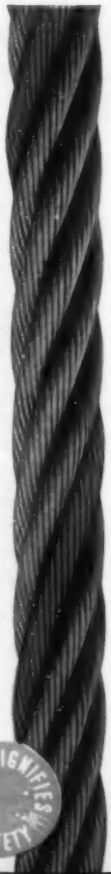
THE MARION STEAM SHOVEL CO., Marion, OHIO

LAY·SET *Preformed* IS FREE.

The preforming process frees LAY-SET Wire Rope of muscle-bound stresses. Being preformed, Hazard LAY-SET is not hampered by needless strains. Rather, every wire and strand is free to do its full share of work from the very first hour it is put on your machine.

Hazard LAY-SET Preformed is a "pre-broken-in" rope; it resists snarling and kinking; it handles easier, faster, safer and cheaper. It possesses high resistance to bending fatigue and so lasts longer—much longer than non-preformed wire rope. Regardless of where or how you use wire rope, whether for running or standing service, specify Hazard LAY-SET Preformed—the rope that gives you greater dollar value.

Hazard LAY-SET Preformed Wire Rope is "in the service" on countless jobs for the Armed Forces where it is proving its many advantages. Specify it for *your* use.



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Significance of A.R.E.A. Ballast Specifications

NEW SPECIFICATIONS for prepared stone, slag and gravel ballast formulated by the American Railway Engineering Association, and reproduced in this issue, represent a forward step in the preparation of purchasers' standards. For the first time, the three competitive materials have been brought together under a single set of standards, with uniform requirements except for grading.

The specifications committee of the A.R.E.A. is to be commended for its efforts in drawing up this composite specification. It will work no new hardships on producers of either type of material, but will serve to place their products on an equal footing insofar as quality is concerned. Adequate recognition is still given to the physical peculiarities of the different materials in the size and gradation requirements so that railway engineers may specify ballast materials from any source that fulfills the quality requirements and accept delivery of a product suitable to traffic conditions. Pit run gravel continues under a separate specification since, of course, this material is variable and unsuited to definite controls.

A detailed study of the new specifications does not reveal any startling changes for, after all, a committee of experts has been at work 25 years or more and their previous standards have been the results of intensive study. Yet, there are a few revisions that will bear study by producers of either material.

It appears that the quality standards have stiffened a bit, although it might not work out that way, since many railway engineers exercise considerable latitude in adapting their requirements to local materials. Past satisfactory performance will govern.

Specification Stresses Soundness

The new specification stresses that soundness of prepared ballast for use in regions subject to freezing temperatures should be such that the weighted average loss in the sodium sulfate soundness test should not exceed ten percent after five cycles. In the discontinued specification for gravel ballast, the 15 percent limit in effect for concrete aggregates was recommended. For stone ballast, the allowable loss was not explicitly stated while, for slag, 15 percent loss was permissible.

From the point of view of the railroads, soundness and resistance to abrasion are of importance for many reasons. Ballast materials that break down prematurely under service conditions not only bring about early replacement but sometimes are extremely costly to remove. We have heard of instances where "soft" stone has broken down to a packed, impermeable condition that practically necessitated blasting for removal.

Another important change is standardization on the Los Angeles machine for measuring the resistance to abrasion for all three ballast materials. The 40 percent recommended upper limit for wear might affect certain producers who formerly barely satisfied the Deval abrasion test, now discontinued, if the engineer interprets the specification literally. Past satisfactory performance of a material will generally suffice.

Limits for deleterious materials remain the same for all materials and there are no requirements stated, as there were before for stone ballast, for special scrubbing machinery or for the testing of various strata in a quarry separate from each other where notable differences in the stone are known to exist.

Trend to Finer Sizes?

Gradations for stone ballast have undergone no change. For gravel ballast of the type which must have 0 to 20 percent crushed particles, the percentage passing the ½-in. sieve has been raised from 50 to 80 percent to 50 to 85 percent. This is in the direction of a finer product, which has been the tendency over the years for gravel ballast. The 5 percent change can hardly adversely affect any producer and it might help a few with deposits high in gravel sizes in the one-half inch range, if interpreted literally by the engineer. The gradation for slag ballast is toward smaller sizes as well.

Few of the large railroads have incorporated the new specifications into their own, at least so far, but the ballast they specify usually closely coincides with one of the types and grades specified in the standards.

Leading railway engineers are generally agreed that the specifications are an ideal worth approaching, but there is no way of changing the physical properties of deposits economically available to their roads and, for that reason, they will continue to design grading specifications to suit a local source of supply. Ballast is, after all, a revenue-free commodity and lengthy hauls are frowned upon.

Apparently, there never will be standardized thinking, on the part of railway engineers, as to which type, or grading, of ballast is the best. Some of the heavy traffic roads are confirmed believers in large sized open gradings of stone or slag while others swear by gravel with a high percentage of fines, or pit run gravel. The variables are so many, that practically every engineer gives us a different opinion. But, we do believe, from interviews with railway engineers, that there is to come a trend toward smaller top sizes of gravel and the practice of using more fines will continue.

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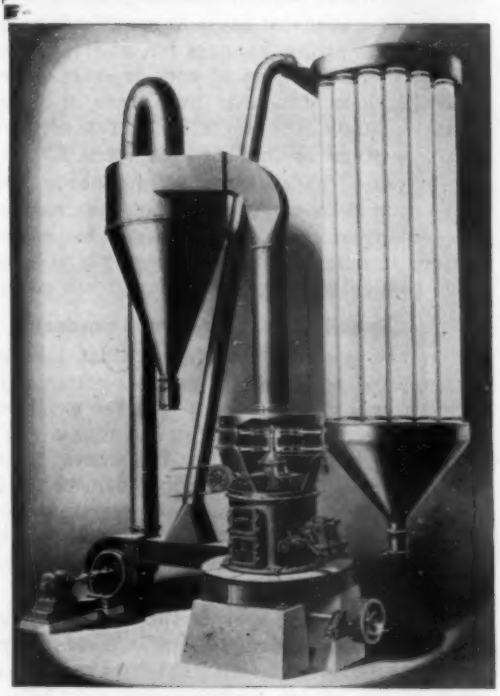

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★ ★ ★ Washington NEWS

EFFECTIVE June 10, 1944, members of the ready mixed concrete industry in the Northeastern Area of the United States (see ROCK PRODUCTS, May, 1944, p. 37) have been authorized by O.P.A. to increase their March, 1942, ceiling prices by the exact amount of the increased cost of cement charged to the products by cement companies under Amendment 6 to MPR 224. The order is contained in Amendment 39 to Order A-1, MPR 188. Executive Secretary V. P. Ahearn of the National Ready mixed Concrete Association pointed out that while the O.P.A. action in this instance was confined to the Northeastern Area, it may be regarded as setting a pattern in the event O.P.A. decides to increase cement prices in other areas, and it is believed there is a possibility of such increases.

Concrete Buggies or Carts

Concrete buggies and carts, two-wheeled devices for carrying concrete, have been excluded from the provisions of General Limitation Order L-111, W. P. B., dealing with hand trucks and other handling equipment, effective May 30. This action results from the fact that this type of equipment is covered by Order L-192, dealing with construction machinery and equipment. Furthermore, the amendment eliminates the requirement that manufacturers of hand trucks and other handling equipment file a report on their operations on or before the 15th day of each calendar month on Form WPB-2494 (formerly PD-845). Many concrete product manufacturers, precast concrete producers, and ready mixed concrete companies are using this type of equipment.

Reemployment of Veterans

National headquarters of Selective Service has issued a memorandum recently for the guidance of local boards and the reemployment committee attached to the board, in which is outlined the policies and principles governing administration of the reemployment provisions of the Selective Training and Service Act. J. R. Boyd, Administrative Director, National Crushed Stone Association has sent out to the membership of his association copies of Local Board Memorandum No. 190-A covering administration of the Act, and everyone in the rock products industry should be familiar with its provisions. Returning veterans are entitled to certain rights with respect to positions they left when joining the armed forces. The number of such veterans now returning to civil life is rapidly increasing and it is therefore highly important that employers be familiar in some considerable detail with their obligations to returning veterans.

Seek Renegotiation Exemption

The National Ready Mixed Concrete Association has filed a new application for exemption of the ready mixed concrete industry from renegotiation under provisions of the Revenue Act of 1943 which deal with standard commercial articles. In 1943 the Association asked for the exemption of ready mixed concrete from renegotiation, on the basis that the industry was engaged only in a simple processing of commodities which were themselves exempted from renegotiation, but this application was denied on the ground that however simple the processing, any refinement or treatment beyond the first form or state suitable for industrial use closed the doors for exemption to the industry.

At the time the 1943 application was submitted, cement was on the list of exempted products, but in a public statement on May 12, 1944; the War Contracts Price Adjustment Board advised that lime and cement "which were formerly considered as exempt by the departmental boards, were determined by the War Contracts Board to be non-exempt on the ground that they are made from materials that have themselves reached the stage where they are suitable for industrial use." By this interpretation, the ready mixed concrete industry was deprived of the argument that it is exclusively engaged in handling materials which are themselves exempted, now that cement is off the list. However, there has been no change in the exempted status of sand and gravel and crushed stone.

In the May 12 statement, the War Contracts Board advised that exemption from renegotiation of numerous articles under the standard commercial articles provisions of the Renegotiation Act had been denied, but these articles were the following: "alcohol, bucket loaders, portable belt conveyors, clamshell buckets, electro-cardiographs and related supplies and repair parts, marine clocks and clock work mechanisms, aircraft bolts and screws, bolted steel and wood tanks, .22 calibre rifles and spare parts and accessories."

Refractory Prices

Authorization of maximum prices for Zircoat by Basic Refractories, Inc., has been granted by O.P.A. Order No. 1609 under 1499.158 of MPR No. 188, effective May 18, 1944. The company has been granted specific authorization to sell and deliver Zircoat at the following prices:

	Col. (1) Maximum price to distributors per cwt. f.o.b. Nario, Ohio	Col. (2) Maximum price to consumers per cwt. f.o.b. Nario, Ohio
Less than 500 lb..	$8.75	$14.50
500 lb. to less than 2000 lb....	8.50	13.00
2000 lb. to less than 30,000 lb..	8.00	11.50
30,000 lb. to less than Carload ..	8.00	10.75
Carload	8.00	10.00

On or before September 1, 1944, the company must file a detailed report covering its first 90 days' operation after the effective date of the order showing the following information:

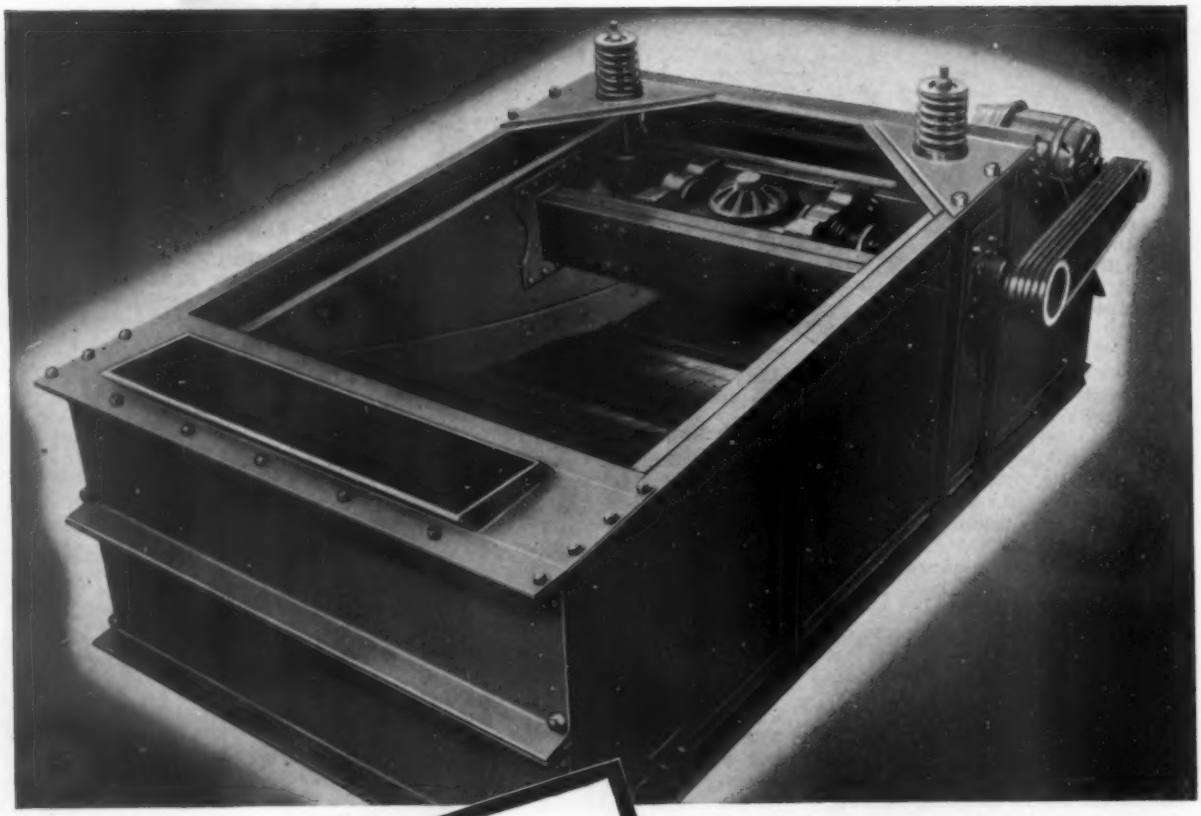
1. Detailed breakdown of the cost of producing and selling Zircoat, for sales to different classes of purchasers, during the 90-day period, showing separately the quantities produced.
2. Total Zircoat sales in quantities and dollars for the 90-day period, segregated as to sales made to different classes of purchasers.

Concrete Block, Cement, and Tile Priorities for Farmers

Amendments have been made to W.P.B. Priorities Regulation 19 to aid farmers in obtaining available supplies necessary for farm operation. The amendments, issued May 6, also expand the list of items affected, and raise the priority of certificates covering those items from AA-5 to AA-2X, with the exception of a few building materials. In addition to such strictly farm implement items as hay stacker cable, harness repair tools, etc., the list of materials on which high priorities are granted include: Concrete block, portland cement, insulating materials, and drain tile.

Number of Days of Work

Recently the Department of Labor, Washington, D. C., issued a release concerning the application of Executive Order No. 9240 where certain unusual shift problems were involved. This release answers questions concerning these problems, and gives, with appropriate examples, the principles which govern.



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Rocky's NOTES

WE HAVE OFTEN wondered if the officers of companies which quarry and process limestone are familiar with all the various state and national geological survey literature pertaining to their particular limestone formation. This kind of literature is growing steadily in volume, and while probably much of it is of value only to geologists, all of it should be of some interest to the limestone quarry owner or operator.

A recent addition to this literature is "Stratigraphy and Fauna of the Louisiana Limestone of Missouri" by James Steel Williams, U. S. Geological Survey, prepared in coöperation with the Missouri Geological Survey and Water Resources—Professional Paper 203, price 50c. It so happens that this particular limestone is of more interest because of the fossils it contains than because of its industrial usefulness, although it once was used fairly extensively for lithographic stone.

The Louisiana limestone occurs in the Mississippi Valley for a number of miles on each side of the town of Louisiana, including Quincy, Ill., and Hannibal, Mo. It is or has been quarried for lime, cement, crushed stone for highways and for agricultural limestone.

Most of the report is devoted to a description and identification of the fossils, and one could gain quite an education in paleontology by studying the descriptions and accompanying illustrations of the fossils found in this bed of limestone.

Ohio Dolomites

A FAIRLY RECENT state geological survey report that we haven't heretofore given adequate mention is "Dolomites and Limestones of Western Ohio," by Wilber Stout, state geologist, published by the Geological Survey of Ohio late in 1941. This is a book of 450 pp. and covers very thoroughly a great many dolomite and limestone deposits which form the basis of great industries in this state. The counties covered are those west of eastern boundaries of Erie county on the north and Lawrence county on the south, which includes the famous Ohio dolomitic lime operations in Sandusky county.

The report contains a great many chemical analyses, some of which should be quite interesting to producers of agricultural limestone. For example, many formations show from 0.1 to 0.2 percent of apatite ($3CaO.P_2O_5$). This is the principal ingredient in rock phosphate. Say 0.15 percent and an application of 4000 lb. (2 tons) of agricultural limestone to the acre, and the farmer is also spreading phosphate of lime on his land to the amount of 6 lb. per acre—not very much to be sure, but it is thoroughly spread, being well diluted with limestone, and he isn't paying anything for it.

It would seem that the quarry owner fortunate enough to have this kind of a limestone could well capitalize on it in his sales work. Also some of the limestones contain from 0.1 to 0.2 percent or more iron minerals of one kind or another. Some limestones quarried near Columbus have as much as 0.4 percent iron minerals. Iron also is very important, in small quantities, to many crops.

The report contains probably the largest number of chemical analyses of limestones, including dolomites, in any one volume, and in more detail than such analyses are customarily given.

Included is a chapter on the uses made of the various formations, including lime and portland cement, silica brick, sand-lime brick, ceramic products, glass, mineral wool, soda ash, and various other basic chemicals in which lime plays an important role. It is one of the best short summaries on the uses of limestone we have ever seen. In conclusion there is a directory of producers, by counties, with the name of the geological formation in which the quarry is located.

International Smoke

UNITED STATES BUREAU OF MINES has recently issued "Report Submitted to the Trail Smelter Arbitral Tribunal"—Bulletin 453. The title gives no clue whatsoever to the uninitiated, but this report is, nevertheless, interesting and important to all industrial operations which produce smoke or vapors and turn these loose into the atmosphere to the annoyance or damage of their neighbors.

The Trail Smelter Arbitral Tribunal is an international commission of the Canadian and American governments appointed in 1935 on complaints that sulphur dioxide smoke or fumes from the smelters at Trail, B. C., were drifting over the international boundary into the upper Columbia River valley in Washington State, and damaging vegetation.

The report consists of about 300 pp. and describes in great detail the scientific work done to find out how and where and why the fumes came over into the valley, the concentrations of SO_2 encountered at various places, etc. All this involved elaborate studies of weather, wind currents, the effect on vegetation, and many other phases. It resulted in findings which permitted the smelters to operate with the least pollution of the atmosphere considered feasible at the present time. These smelters are not wasting any more SO_2 than they can help. They operate sulphuric acid plants and acid phosphate plants to make use of this by-product; nevertheless there is an average daily emission of SO_2 to the atmosphere of 117 tons.

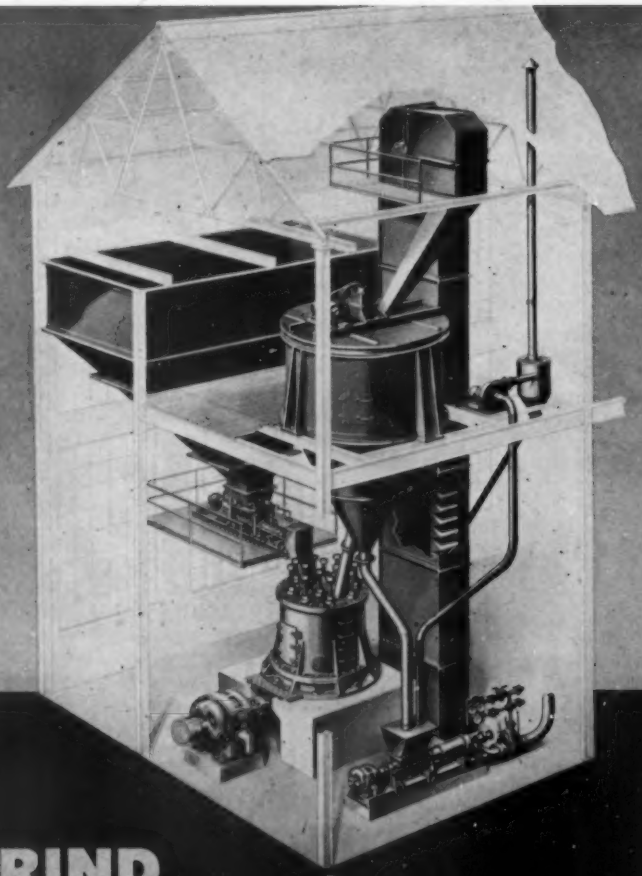
The problem of SO_2 smoke is a common one, although there are appreciable amounts of SO_2 in the coal smoke of all cities and industrial plants. The report is of general interest, however, because the day is coming when the human inhabitants of this planet are going to object to pollution of the air they breathe, as they do now to pollution of the water they drink. Hence this study of a particular problem may serve as a guide to future investigations.

Nathan C. Rockwood

"Quarrying" Oil in California

IT IS REPORTED that millions of barrels of oil are locked in the sandstone of six California coastal counties which eventually may be mined for the extraction of vitally needed petroleum products, according to a recent statement by Secretary of the Interior Ickes. Bureau of Mines' chemists are now trying to develop a commercial process for extraction of the oil. Dynamite instead of pumps will be used to unlock this new source of oil. Unlike the oil shales of other states, it is said that the California rocks are saturated with a true petroleum similar to that taken from ordinary oil wells. Experiments in San Francisco already have resulted in extraction of oil from rock obtained in the Edna area of San Luis Obispo county, but not by a commercially feasible method. The counties in California where the oil-saturated rock is found are: Kern, Ventura, Santa Barbara, San Luis Obispo, Santa Cruz, and Mendocino.

This new development may open up some new opportunities for quarry men.



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News ABOUT THE INDUSTRY AND PEOPLE

Elected Board Chairman

R. K. NEILL, president of the Spokane Portland Cement Co., Spokane, Wash., has been elected chairman of the board. Walter B. Neill, his son and formerly vice-president, has been named president. G. M. Bell was elected vice-president and secretary-treasurer. The following directors were reelected: R. K. Neill, Walter B. Neill, G. M. Bell, Walter T. Lamp, John P. Hartman, A. W. Witherspoon and S. A. Mitchell.

Joins Graystone

RALPH H. YOUNG, well known engineer, has joined the engineering and field service staff of the Graystone Concrete Products Co., Seattle, Wash. Mr. Young was formerly with the civil aeronautics administration as materials engineer on the Seattle-Tacoma airport project. He has been engaged since 1931 in field engineering on federal highways, airports and other projects, including Yellowstone and Glacier National Parks. He attended Cornell college and the University of Washington. In his new position Mr. Young will work closely with engineers, architects and contractors, and will be available for assistance on problems connected with the design and application of the precast concrete manufactured by the company.

A.S.A. Safety Committee

HARRY C. HARPER, commissioner of labor of New Jersey, has been appointed a member of the American Standards Association's committee on safety in the construction industry.

Control Director

ROBERT G. RAUSCHER, controller, Warner Co., Philadelphia, Penn., has been reelected a director of the Philadelphia Control of the Controllers Institute of America for the fiscal year 1944-45.

Rejoins Overseas Unit

T-SGT. DONALD M. OLSEN, who assisted his father in the operation of the Lyman-Richey Sand & Gravel Corp. plant at Valley, Neb., before entering the army in July, 1942, is now back in the army in New Guinea. He had been ill most of the winter after an appendectomy.

Federal Board Director

JOSEPH F. GORMAN, president, Federal Lime Stone Co., Cleveland, Ohio, has been elected a director of the Second Federal Savings & Loan Association. He will serve out the unexpired term of Donald Hosmer, who resigned to take a foreign assignment with the Department of State.

Manages Wolverine Plants

LATHAM B. GRAY, formerly general manager for Dominion Minerals, Inc., Piney River, Va., has been appointed manager in charge of the Quincy and

Latham B. Gray

Coldwater, Mich., plants of the Wolverine Portland Cement Co., Kalamazoo, Mich. Mr. Gray for the past ten years has been a member of the A.I.M.M.E. where he has served as a member and chairman of the Mineral Aggregates Committee. He also has been an executive of several large crushed stone companies. His broad experience and background will enable the Wolverine company to proceed with the program of plant modernization and cost reduction that has already been started.

Named Secretary-Treasurer

C. BRUCE FLICK has been elected secretary-treasurer of the Pacific Portland Cement Co., San Francisco, Calif., to succeed Andrew H. Canvin, who died recently.

Receives LaSalle Award

CHARLES WARNER, president, Warner Company, Philadelphia, Penn., has been presented with the Pennsylvania De LaSalle Award of the LaSalle College Civic and Social Congress for the deep interest he has taken in the welfare of his employees and for his success in building friendly relations between management and workers. The presentation was made by Brother Alfred, president emeritus of LaSalle College. On the same occasion Henry J. Kaiser, nationally known shipbuilder, was presented with the national medal for his "most conspicuous and constructive service to the cause of industrial peace in America."

Heads Post-War Research

CHESTER E. HARING, former vice-president and director of marketing for Batten, Barton, Durstine & Osborn, and previously market research director for Fuller & Smith & Ross Advertising Agency, has been placed in active charge of the Post-War Marketing Research Project of the Committee for Economic Development.

Builds Allied Runways

LT. COL. JOHN J. LIVINGSTON of Cedar Hill, Mo., who some years ago managed a Hardin county, Ill., fluorspar mine, has completed his assignment for D-day, which was the preparation of one of the landing strips from which allied planes are now flying in France. Col. Livingston's aviation engineers battalion had the runways ready for action within a couple of hours after the equipment went ashore. He is a veteran of Morocco, Algeria, Tunisia, Sicily, Italy and Sardinia, where he helped build several hundred landing strips, including some built behind German lines.

Retires

JAMES KESSON, SR., marine inspector and maintenance supervisor at the Berks Street Yard of Warner Co., Philadelphia, Penn., has retired after more than 30 years of service with the company. He was presented with a purse and a letter to which were signed 67 names as a farewell present. Mr. Kesson has been associated with Warner Co. since 1910 and plans to make his home at Wildwood Crest, N. J.

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LT. COL. J. G. ROSS, manager, Asbestos Corp., Ltd., Thetford Mines, Quebec, Canada, has retired from active management of the company but will remain on the board of directors. He has been appointed consulting engineer, so his long experience in the industry will still be available to the company.

N.A.M. Post-War

PAUL B. REINHOLD, president of the Atlas Equipment Corp., Pittsburgh, Penn., has been appointed a member of the Post-War Committee of the National Association of Manufacturers.

New Lime Directors

As a result of the recent election in the various districts of the lime industry, the following members were chosen to serve on the board of directors of the National Lime Association during the fiscal year beginning July 1, 1944:

District 2—H. D. Brigstocke, Thomasville Stone & Lime Co.; Bolton L. Corson, G. & W. H. Corson, Inc.; and E. D. Williams of H. E. Millard; District 3—Amos B. Miner, National Gypsum Co.; Reed C. Bye, Warner Co.; and Ralph L. Dickey, The Kelley Island Lime & Transport Co.; District 4—J. A. Dunaway, Peery Lime Co., Inc.; District 5-A—Wilfred W. Sprague, National Mortar & Supply Co.; District 5-B—E. C. Powers, The Marble Cliff Quarries Co.; District 6—Gordon W. Hughes, Inland Lime & Stone Co.; District 7—No members; District 8—C. E. Brady, Allwood Lime Co.; District 9—Henry LaLiberte, Cutler-Magner Co.; Districts 10-11—K. L. Hammons, Keystone Lime Works, Inc.; District 12—Paul Sunderland, Ash Grove Lime & Portland Cement Co.; District 13—G. E. Robinson, Austin White Lime Co.; District 14—Ernest L. Frank, Washington Brick & Lime Co.; District 15—No members.

Association President

W. D. Van Arnam, general sales manager of the filtration and filler department of Johns-Manville, New York, N. Y., has been elected president of the Laundry and Cleaners Allied Trades Association. Mr. Van Arnam is a recognized authority on filtration and filter aid problems. He graduated from Cornell University in 1916. In 1922, he joined the Celite Company which was merged with Johns-Manville in 1928.

Named Vice-President

C. B. Pooler has been appointed vice-president in charge of manufacturing of The Philip Carey Mfg. Co., Cincinnati, Ohio. Mr. Pooler has spent practically all of his life in the building material industry. He was born in Fort Dodge, Iowa, and trained as an electrical and mechanical engineer. He has served as production manager, plant manager, division operations manager and manager of labor relations in plants producing fabricated steel, metal lath, insulating board, roofing, paints, paper, asbestos and gypsum products.

Asbestos Representative

C. H. Latchem, former vice-president and general sales manager of the Carolina Asbestos Co., Davidson, N. C., has been appointed Midwest representative, with headquarters at 592 N. Wabash Ave., Wabash, Ind. Mr. Latchem has long been identified with the asbestos textile industries, his first connection being with the Mikesell Co. Later he joined the Southern Asbestos Co., Charlotte, N. C., and was soon made vice-president of the company. In 1930 he resigned to become president of the Rockwool Products Co. He came with the Carolina Asbestos Co. in 1937 as vice-president and general sales manager, but resigned in 1939 to accept a Government commission which took him to Trinidad and British Guiana. Later he returned to this country to serve in the rock wool division of the War Production Board, and was induced to return to Carolina Asbestos Co. as sales representative in the Midwest territory.

Silver Anniversary

Paul M. Kingsley, office manager at the Brighton, Mich., plant of the American Aggregates Corp., is celebrating his 35th year with the organization. Mr. Kingsley began in the office of the Kalamazoo, Mich., plant in June, 1919, and remained there for two years before being transferred to the Massillon, Ohio, plant. In 1923 he was transferred to the Richmond, Ind., plant. After two years in Richmond a series of transfers took him to Somerset Center, New Hudson, back to Kalamazoo and then to Brighton.

Democratic Chairman

John C. Hazzard, agricultural lime sales manager, Warner Co., Wilmington, Del., has been unanimously elected chairman of the Democratic State Committee for Delaware.

Elected Bank Trustee

Ernest M. Hammond, president, Gravel Products Corp., Buffalo, N. Y., has been elected a trustee of the Western Savings Bank in Buffalo.

Ernest M. Hammond

A.S.T.M. Honorary Member

T. A. Hicks, recently retired as general chemist of the Universal Atlas Cement Co., New York, N. Y., has been elected an honorary member of Committee C-1 on Cement, American Society for Testing Materials. Mr. Hicks has been active in the work of the committee since 1914 and is the first person to be thus honored.

Gypsum Supervisor

J. R. Welch, district engineer for the U. S. Purchasing Commission in Brazil, has returned to the United States and recently started to work for the U. S. Gypsum Co., as production supervisor in the Sweetwater, Texas, plant.

Becomes District Engineer

A. J. Kavanaugh, formerly secretary-manager of the Oklahoma Good Roads Association, has been appointed district engineer of the newly established office of The Asphalt Institute in the Petroleum Building, Oklahoma City, Okla.

Ideal Promotions

George Wiley, acting chief engineer, Ideal Cement Co., Denver, Colo., has been promoted to general engineer, and Harold Lamont, acting superintendent, has been made superintendent of the Gulf Portland Cement Co., Houston, Texas.

Manpower for Feldspar

Colorado Feldspar Company, Canon City, Colo., is seeking labor to open a property in Werner's Gulch near Parlin, Colo. J. E. Meyers is manager of the company. There is plenty of vitally needed feldspar for the war effort in Gunnison county if sufficient labor can be found to get it out, said Mr. Meyers.

Ballast from River

The Ohio River Sand and Gravel Corporation, New Martinsville, W. Va., recently received a contract from the Baltimore & Ohio Railroad to furnish approximately 100,000 tons of railroad ballast this season. Two dredges are now engaged at New Martinsville and Distersville dredging material for ballast from the Ohio river.

Consulting Engineer

Lewis A. Parsons, mining and research engineer for the Calaveras Cement Co., San Francisco, Calif., has been appointed consulting engineer.

In the Army

Paul E. Duncan, analyst for the Marquette Cement Mfg. Co., LaSalle, Ill., is now in the Army.

Approve Highway Bill

HOUSE ROADS COMMITTEE on June 2 gave unanimous approval to H.R. 4915 by Chairman J. W. Robinson of Utah, authorizing $1,500,000,000 in Federal-aid highway funds to become available at the rate of $500,000,000 for each of the three successive post-war fiscal years. The measure further provides that $500,000,000 shall be apportioned among the states and become available for contractural obligation within 30 days from the passage of the bill, and that $500,000,000 for the second fiscal year shall be apportioned among the states and become available for contractural obligation within 30 days from the passage of the bill, and that $500,000,000 for the second fiscal year shall be apportioned among the states and become available for contractural obligation January 1, following the first apportionment.

If the bill becomes law, the effect will be to make available by January 1, 1945, $1,000,000,000 in Federal funds for post-war highway construction. This would enable state highway departments to proceed with plans for specific projects and to lay before state legislatures meeting next year plans for matching Federal funds. No provision is made in the bill for date of apportionment or availability of the $500,000,000 for the third fiscal post-war year.

The formula of apportionment of funds among the states is changed from the traditional Federal-aid method of one-third population, one-third area, and one-third road mileage to a new basis of one-half population, one-fourth area and one-fourth post road mileage.

The bill further provides that after making deductions for administration, research and investigation, the money shall be used as follows: 1. $225,000,000 for the Federal-aid highway system either inside or outside municipalities; 2. $125,000,000 for principal, secondary and feeder roads, including farm-to-market roads; and 3. $150,000,000 for principal highways in urban areas on the Federal-aid highway system.

Proposed matching basis for the first year is 60 percent Federal funds, 40 percent state funds with the regular 50-50 matching basis applying thereafter. Special provision is made for states with large areas of publicly-owned land.

Blast Damage Case

THE DIXON VS. NEW YORK TRAP ROCK CORPORATION case has been appealed to the Court of Appeals from a decision of the Appellate Division, New York Supreme Court. John C. Gall appeared as counsel for the National Crushed Stone Association and filed a Brief Amicus in the case. The Appellate Division affirmed the judgment of the Referee, modified only by striking out the judgment in favor of one of the plaintiffs for injury to health but confirming all findings and conclusions of law relating to damage to the house. There was one dissenting opinion which affords to the defendant the right of appeal to the Court of Appeals.

Big Limestone Orders

LEWISTON LIME CO., on Mission Creek near Sweetwater, Idaho, was scheduled to start production on June 1, according to Wylie Hemphill, co-owner of the plant. It now has orders for 800 carloads of limestone. The plant is expected to ship 300 carloads to the Bunker Hill & Sullivan smelters at Kellogg; 200 carloads to the Weyerhauser plant at Longview; 100 carloads to the sugar refinery at Toppenish, and 200 carloads to the paper mills situated at Camas on the lower Columbia river.

To Install Dust Collector

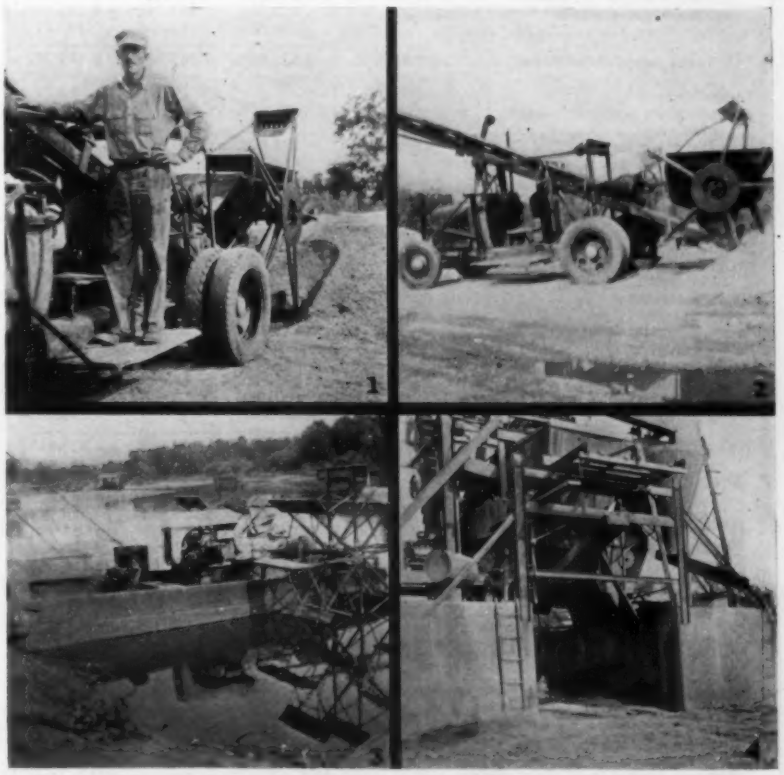
NEWS reports from Manitowoc, Wis., indicate that the Manitowoc Portland Cement Co. will install dust collector equipment at this plant. It is reported that J. B. John, president of Medusa Portland Cement Co., Cleveland, Ohio, owners of the Manitowoc plant, after a conference with city officials, announced that the company has appropriated $30,000 for this equipment.

Sell Gravel Concern

OHIO GRAVEL CO., Cincinnati, Ohio, has acquired the Hamilton county operations of the Miami Gravel Co., involving properties valued at $125,000, according to an announcement made by Walter J. Flach, vice-president of the Ohio Gravel Co. These properties adjoin 88 acres owned by Ohio Gravel at Miami Station. In addition, Ohio Gravel operates properties at Newton, at Miamisville, at Cleves, and distributing tipples in Covington, Ky., and Bond Hill. The Miami Gravel Co., Huntington, W. Va., which also operates at Chillicothe, Ohio, retains all its other properties.

Building Glass Sand Plant

H. L. MARKLAND CO., Waco, Texas, is planning to build a $150,000 plant in Santa Anna, Texas, for cleaning, drying and processing glass sand. It is estimated that 100,000,000 tons of white siliceous sand underly the surface of Santa Anna mountain. Santa Anna formerly had a glass manufacturing plant producing milk bottles in large quantities.



Don Hart gravel plant has unusual equipment. Figs. 1 and 2 show portable conveyor with hopper which may be raised. Fig. 3: Paddle wheel dredge boat and Fig. 4: Screening plant

Develop Limestone Project

G. M. GREY and associates have leased from Mrs. Freda McGill three sections of land in the Pit and McCloud river area northeast of Redding, Calif., for the purpose of developing limestone deposits. It is planned to mine the limestone, grade and crush it at the site, and ship it to other points for processing. It is reported that the Shasta limestone would be used, under present plans, for cement, in sugar refining, mining operations, fertilizer, and other uses. Ultimate plans, it is said, include a plant which would include the flotation process.

The same interests also have leased a large tract of land in this area containing big deposits of high-grade iron ore. Although no immediate development of the iron ore deposits is contemplated, the limestone project will be carried out immediately. Electric furnaces may be installed to smelt the iron ore.

Add Mill to Mica Plant

MICA GEM MINING AND MILLING CORPORATION, La Mesa, San Diego County, Calif., is planning to install a second mill for grinding, separation and classification of mica, feldspar and silica, according to Edward Boughton, secretary-treasurer. Operations have started near Jacumba, Calif. Excavation is by the open pit method. Joseph Hubbell is general superintendent at the Jacumba plant.

Final 1943 Gypsum Statistics

BUREAU OF MINES report on the final annual figures for gypsum in 1943 show the effect of wartime controls on construction. There was a 17 percent decline in domestic crude mined during 1943 over 1942, and a 16 percent drop in production of calcined gypsum. It was pointed out, however, that the rate of decline in over-all activity was eased markedly through 1943, and in the fourth quarter the trend was nearly horizontal. Demand increased for certain of the pre-fabricated materials and the sales of wallboard and laminated board advanced to a record in 1943. On the other hand, demand for plaster, lath and tile fell below the 1942 level. Statistics for 1943 are as follows:

TABLE 1. GYPSUM PRODUCTS SOLD OR USED IN THE UNITED STATES

	1942		1943	
	Short tons	Value	Short tons	Value
Uncalcined:				
Portland-cement retarder	1,245,277	$ 2,543,272	835,495	$ 1,762,414
Agricultural gypsum	251,998	823,645	382,346	1,201,704
Other uses	17,638	166,690	15,886	150,671
Total uncalcined uses	1,514,913	3,533,607	1,233,727	3,114,789
Industrial:				
Plate-glass and terra-cotta plasters	18,096	119,849	20,000	131,441
Pottery plasters	30,856	423,927	34,803	460,374
Orthopedic and dental plasters	14,319	438,375	14,764	388,873
Other industrial uses	79,434	858,776	93,933	1,278,293
Total industrial uses	142,705	1,840,927	163,500	2,258,981
Building:				
Cementitious:				
Plasters:				
Base-coat	848,280	7,596,058	527,596	4,720,209
Sanded	101,497	638,388	72,566	445,948
To mixing plants	17,527	111,348	24,851	112,931
Gauging and molding	105,728	1,279,506	74,002	868,091
Prepared finishes	8,990	348,818	4,329	107,135
Insulating and roof-deck	48,266	385,102	44,643	342,619
Other	12,107	485,980	13,456	593,552
Keene's cement	14,848	238,467	8,019	125,630
Total cementitious	1,157,243	11,083,667	769,462	7,316,115
Prefabricated:				
Lath[1]	717,638	12,116,144	475,900	7,863,506
Wallboard[2]	873,302	23,200,410	1,027,534	27,296,293
Sheathing board[3]	374,550	7,016,015	237,768	4,683,376
Laminated board[4]	55,676	1,464,090	211,105	5,450,818
Tile[5]	143,221	2,915,884	66,354	1,112,654
Total prefabricated	2,164,387	46,712,543	2,018,661	46,406,647
Total building uses	.....	57,796,210	.....	53,722,762
Grand total value	.....	63,170,744	.....	59,096,532

[1] 1942: 959,307 M sq. ft.; 1943: 630,639 M sq. ft.
[2] 1942: 1,046,025 M sq. ft.; 1943: 1,241,828 M sq. ft.
[3] 1942: 369,313 M sq. ft.; 1943: 231,356 M sq. ft.
[4] Square footage in terms of component board—1942: 53,170 M sq. ft.; 1943: 200,815 M sq. ft.
[5] Includes partition, roof, floor, soffit, shoe, and all other gypsum tiles and planks—1942: 24,664 M sq. ft.; 1943: 11,638 M sq. ft.

COMING CONVENTIONS

National Crushed Stone Association, Board of Directors, Hot Springs, Va., July 20, 1944.

National Ready Mixed Concrete Association, Semi-Annual Meeting, Board of Directors, Palmer House, Chicago, Ill., August 15, 1944.

National Ready Mixed Concrete Association, Annual Meeting, Hotel New Yorker, New York, N. Y., January 24-26, 1945.

National Sand and Gravel Association, Annual Meeting, Hotel New Yorker, New York, N. Y., January 23-25, 1945.

National Sand and Gravel Association, Semi-Annual Meeting, Board of Directors, Palmer House, Chicago, Ill., August 16, 1944.

Building Crushing Plant

E. B. BISHOP CO., Orland, Calif., has constructed a rock crushing, screening, and batching plant near the state gravel pit four miles north of Adin, Calif. From this location material will be hauled and applied to 12 miles of highway which the company has contracted to resurface before August 1. P. L. Wilcox is general superintendent. This job is being rushed to completion so that the crew and equipment can be moved to Port Orford, Ore., to begin a construction job.

Calcining Phosphate

VALLEY FORGE CEMENT CO., W. Conshohocken, Penn., has been busy calcining Florida phosphate rock for various purposes. With bins full, cement has not been manufactured at this plant for some time.

Use Newfoundland Miners

MINERS from Newfoundland have recently arrived at Keene, N. H., to work in the mica mines at Gilsum and Alstead. Movement of the miners from Newfoundland was made in cooperation with the U. S. Army and the War Production Board.

Application of Grading Charts

By NATHAN C. ROCKWOOD

THE ARTICLE in the June issue explained how to plot a chart of the size gradation specification limits, using the standard testing sieves No. 4, No. 8, No. 16, No. 30, No. 50 and No. 100. (This is old stuff and elementary, probably, to many readers, but, as we shall see, ironing out the bumps and sags in our chart *is sand gradation illustrated.*) It has been suggested that the producer plot a sieve analysis of his own product and compare it with the typical specification given (U. S. Bureau of Reclamation) or with any specification he has to meet which gives size gradation limits.

The accompanying Fig. 2 does this for an actual operation. In this case the size specification was given as: *Passing* No. 4, 95 to 100 percent; No. 16, 35 to 75 percent; No. 50, 10 to 25 percent; No. 100, 1.5 to 7 percent. So far as we know, the intermediate sizes were not specified, nor was the Fineness Modulus.

The specified size limits are plotted in Fig. 2 as dash lines with square dots (colored area). The material produced by the original plant is plotted with dotted lines and circular (⊙) dots. The material produced in the new plant, especially designed to meet the specification, is shown in the full line with the triangular dots.

What Chart Shows

A glance at the chart, as soon as one becomes familiar with it, shows that the sand produced by the original plant is short of material passing No. 100 and No. 50, or putting it the other way, reading the left-hand percentages, too much is *retained* on the No. 100 and No. 50 sieves. The sand wasn't so far off on intermediate sizes, but too much passed the No. 16 and No. 8; or putting it the other way not enough was retained on these sieves.

The operating problem presented is one of getting more fines into the product, and of getting rid of some of the minus No. 16 (except for No. 100 and No. 50), or of adding more material that would be retained on the No. 8 and No. 16. It should be kept in mind that the size gradation (percentages of various sizes) can be changed *both* by adding new raw material or substracting one or more sizes that are present in excessive amounts. Either process will, of course, change the percentages all the way along.

Playing with Chart

Taking the example given, suppose we estimate what would be the effect of merely increasing the minus No. 50 by three times (300 percent) and also increasing the minus No. 100 by three times.

(Continued on page 70)

FIG. 2

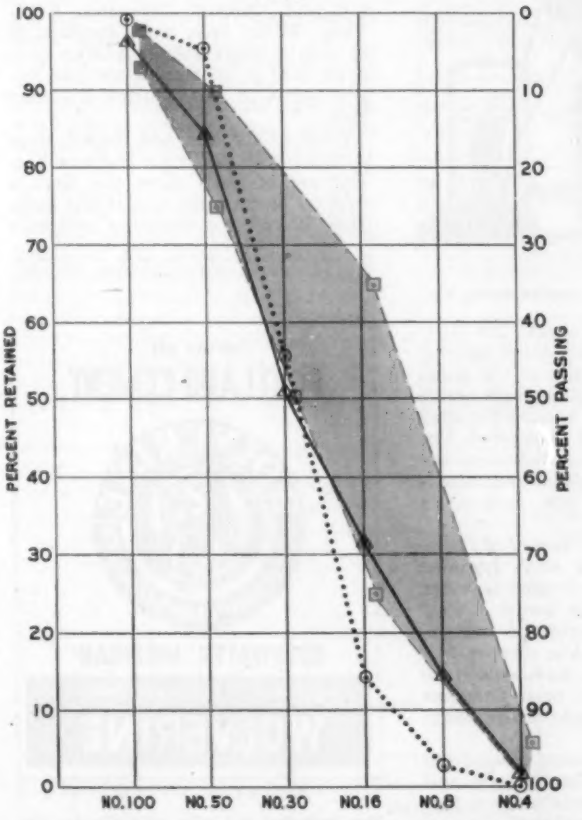
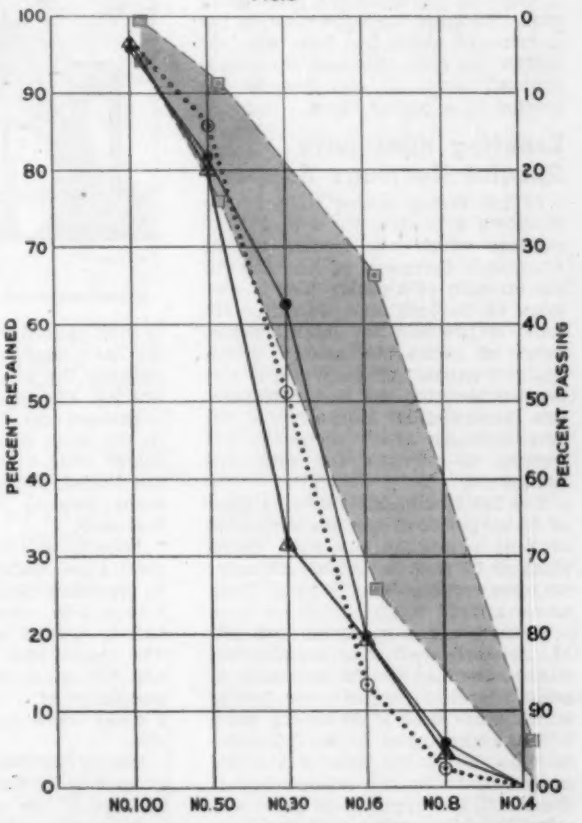


FIG. 3



Charts show how producer can plot sieve analysis of his own product to compare specifications which are to be met. Colored area shows size limits within specification requirements

HINTS and HELPS

Practical Ideas Developed by Operating Men

Cross-Over For Cables

IN THE ILLUSTRATION is shown a "cross-over" for high tension electric shovel cables used by Marquette Cement Manufacturing Co. in its quarry

Portable type cross-over for electric shovel cable made of pipe sections

at Oglesby, Ill. In this case the automobile has been spotted under a 2300-volt line to illustrate the headroom needed for big trucks. Several are in use in this quarry.

The two uprights are telescoping pipe. To move the cross-over, a pin is removed about five feet from the bottom on each side and the top is dropped down. It can then be relocated by a quarry truck.

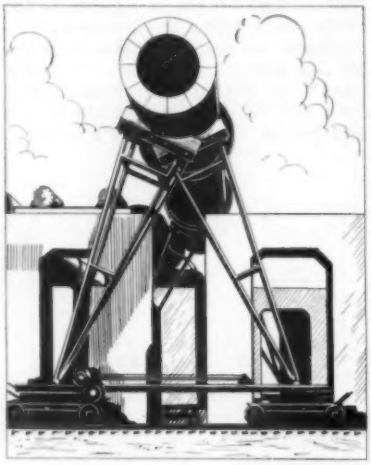
Erecting Kilns with Special Carriage Support

IN THE ACCOMPANYING ILLUSTRATION is shown a scissors-leg support and carriage which was devised by the Aluminum Company of America for the erection of a rotary kiln in sections 98 ft. long and weighing 100 tons. It provides for lateral movement of each kiln section across concrete supporting piers and it also permits lowering the shell into position. Longitudinal movement of the kiln sections after alignment for welding is provided for with this equipment.

The 250 ft. long kilns lie on a slope of ½ in. per foot, and are supported at four points by cast-steel riding rings of 12 ft. 6 in. outside diameter on piers varying from 17 ft. to 25 ft. above ground level.

In the erection operation, two sets of "scissors-legs" that support the ends of the kiln section terminate at ground level in flanged-wheel trucks which move over a section of track laid at right angles to the kiln center line. When the base of the triangle formed by the scissors-legs is shortened, the upper pivot point will raise the kiln sections. If the base length is increased, the kiln section may be lowered. In operation therefore the kiln shell is the upper pivot point of the triangle and the two bottom corners are the lower ends of the scissors-legs. The bottom corners rest on the trucks, and the distance between them can be varied as required by a system of sheaves and wire rope. A single drum hoist, turned by a reversible air motor through a speed reducer, supplies power for the scissors-legs.

At the two bottom corners of the triangle, the ends of the scissors-legs terminate in cast-steel balls which rest in sockets on the movable trucks. The upper ends of the scissors-legs terminate in cradles that fit the outside of the kiln shell and permit rotation with the shell as the center. One scissors-leg has two



Unusual equipment for erecting rotary kiln

cradles spaced 6 ft. apart; the other leg has a single cradle placed midway between the two cradles of the opposite leg. The face of the single cradle is greased and slides around the shell as the latter is raised or lowered. The upper ends of the scissors-legs are not joined, but maintain their alignment because the kiln acts as a trunnion.

Scissors-legs are made of 6-in. steel pipes with the ends trimmed so that they may be welded together into a 6-in. circle to which a steel ball is welded to form the bottom. The cradle ends of the scissors-legs are cut on a miter and welded to one flange of a 12-in. beam that has a wood cradle bolted to the opposite side.

Due to the high piers, cross tying or bracing between the carriages and the tops of the opposite scissors-legs is not possible. As a result the spread of one of the scissors-legs assemblies to 6 ft. between the cradles is an important part of the moving device, as longitudinal stability of the structure depends on this and the beam stiffness of the kiln shell. However, there is sufficient flexibility to permit endwise movement of 6 in. to either side of the neutral position, making it possible to pull the ends of adjacent kiln sections together in preparation for welding.

Each scissors-leg assembly has equal length pipe members, a 2-in. wedge being placed under the "uphill" cradle of the two-cradle unit to allow for the ½ in. per foot slope of the kiln. This keeps the assembly in a vertical plane and reduces the tendency to tip endwise. Sets of scissors-legs are provided for use at each end and each joint of the kiln. Each kiln is raised to near its final elevation by means other than the scissors-legs as the angle at which it would be necessary to start the lift makes the power required almost infinite.

Easily Identified Bag

BAGS now in use at the Wolverine Portland Cement Company, Coldwater, Mich., have been designed to fit into a lively merchandising program that is showing a marked improvement in sales during the past year.

Both utility and eye appeal were considered in designing the new bag. The use of color gives the bags a striking appearance and at the same time affords the company salesmen

New trademark and color scheme makes possible quick identification of brand and type of portland cement in stock

an opportunity to get an at-a-glance inventory of dealers' stocks. The two colors, red and blue, are handled in a manner that distinguishes both the contents of the bag and the quality.

Regular portland cement is packaged in a bag on which the name "Wolverine," the address, Coldwater, Mich., and the wolverine appearing in the new trade-mark, are printed in blue. The words "Portland Cement Company," the background in the trade-mark, and two broad stripes carrying the words "High Quality Portland Cement" in red.

A blue tape sewn across the top against the blue "Wolverine" indicates that the regular portland cement is contained in a regular bag. A red tape sewn across the top against the blue "Wolverine" marks the bag as being moisture proof.

High-early cement is distinguished by a reversal of colors. All high-early bags carry the name "Wolverine," the address, Coldwater, Mich., and the wolverine in the trade-mark in red. The other descriptive matter on the bag is printed in blue.

A red tape sewn across the top of the bag against the red "Wolverine" means tnat the bag contains high early cement in a regular bag. A blue tape sewn across the top and against the red "Wolverine" identifies the contents of the bag as having high early cement in a moisture proof bag.

All bags containing mortar cement are printed in red and green.

The distinguishing colors have been a boon to both the salesman and the dealer. A salesman in glancing over the dealer's stock can tell which items are needed to bring the inventory up to where it should be to meet current demands. The dealer retains the good will of his customers by always providing moisture proof bags when his customer requests them and by eliminating errors in supplying the type of cement called for in the order. Cement buyers have also become aware of the color combinations and are in a position to check errors should they creep in before opening the bags.

Stone Ladder-Screen

ILLUSTRATED herewith, is a stone ladder that also screens crushed stone, in use by the Acme Limestone Co., Snowflake, Va. The company operates a high calcium limestone mine high above its quarry floor and the stone from the mine is crushed through a No. 7½ Austin gyratory crusher at the mine level, some 100 ft. above the quarry floor. This stone must be transported to the lower level and conveyed to a chemical stone plant.

Ladder screen for sizing out minus 1½-in. stone as it is let down from overhead crusher at mine to another crusher on lower level. Ladder is on a 42-deg. incline to vertical

The ladder-screen was developed to let the stone down to a secondary No. 6 McCully crusher and to scalp out minus 1½-in. stone on the way, to by-pass the secondary crusher to a belt conveyor on the lower level. No screens were available and it still would be necessary to lower the stone a considerable distance.

The ladder is set at an angle of 42 degrees to the vertical and there are five consecutive "steps" 5 ft. long by 2 ft. wide of perforated metal with 1⅝-in. hexagonal openings for screening. The stone flows over the plate at tremendous speed, requiring a total of 725 ft. of travel to screen out the minus 1½in. stone by the time it reaches the bottom.

Between each adjoining section there is a horizontal baffle to build up a stone cushion at each transfer point. These cushions absorb the impact, saving wear on steel, and retard the flow of stone just before it hits the next screen section. The throughs follow the bottom of the ladder all the way to the bottom and by-pass the crusher there. The ladder has proven very effective as a scalping screen.

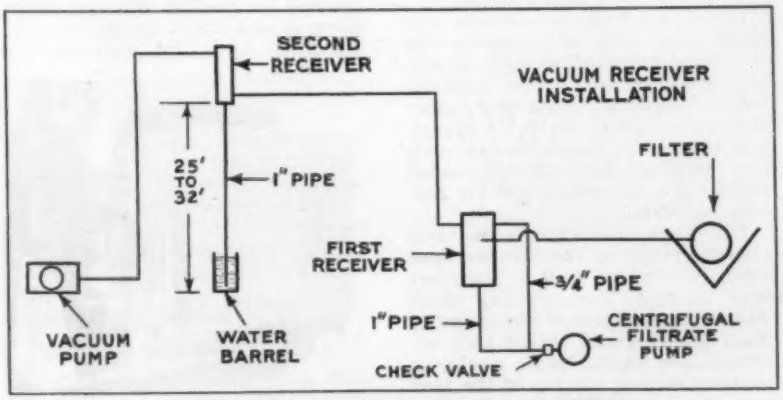
Correcting "Vacuum Receiver Installation"

WITH REFERENCE to W. B. Lenhart's article on page 44, Hints and Helps section, May, ROCK PRODUCTS, Walter Riker of Oliver United Filters, Inc., offers the following corrections to the diagram accompanying the story.

1. First Receiver: The filtrate inlet to the receiver is above the vacuum line piping which would induce carry-over of filtrate, due to the flow of air. All filtrate piping from a vacuum filter to a filtrate receiver should be horizontal or slightly below and enter the receiver well below the vacuum piping. It would be well if the diagram showed the piping to the second receiver as coming out of the top of the first receiver, although its position as shown is okay, if the filtrate line from the filter enters the receiver as shown in the corrected diagram, herewith.

2. Second Receiver: The piping from the first receiver to the second receiver should enter the latter as shown in the illustration. As shown originally in the May issue, it defeats the purpose of the article because if the filtrate pump did go down and filtrate was carried over or fills up the system, it would short circuit into the vacuum pump line and get into the vacuum pump, defeating the purpose of the second receiver installation.

3. Water Barrel and Hydrostatic Leg: The second receiver need only be at an elevation sufficient to satisfy the normal vacuum carried at the filter plus 5 ft. This elevation should be measured from the *bottom* of the second receiver to floor or ground level, rather than from the vacuum pump piping to the floor or ground level. The barrel or tank should have sufficient capacity to fill the hydrostatic leg to the normal vacuum lift and still seal the pipe to insure against loss of vacuum at the filter.

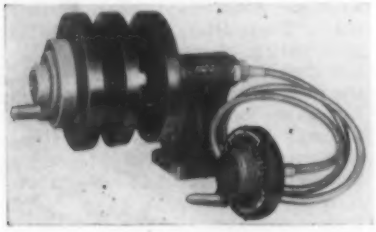


Corrected piping diagram for vacuum receiver installation

NEW Machinery

Variable-Speed Transmission

AMERICAN PULLEY CO., Philadelphia, Penn., has developed a variable-speed transmission with simplified remote control and universal mounting for



Convenient remote control with variable speed transmission

drives up to 1 hp. Known as the Speed-Jack, it is equipped with a remote control through a compact flexible shaft which makes it possible to mount the unit anywhere in or on the machine. The unit may be mounted either vertically, horizontally or in any other position. V-belts are utilized in the variable-transmission to provide stepless control of speed through a 3 to 1 ratio. This unit is said to be adaptable for use on drives for conveyors, drills, packaging machines, etc.

Easily Maneuvered "Dozer"

LA PLANT-CHOATE MANUFACTURING CO., INC., Cedar Rapids, Iowa, has developed for the post-war market its Trailbuilder Model R-82-R, designed for mounting on a Caterpillar D-8 tractor.

A feature claimed for this model is its simple and positive operation. The three-position blade can be angled either to right or left, or held in straight bulldozing position. Either end of the blade can be tilted up or down with a variation of 14 in. while in straight bulldozing position as well as when the blade is in either angling

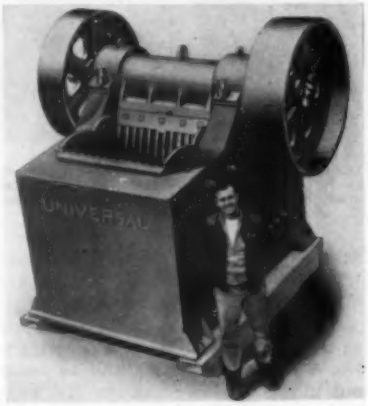
Earth-moving unit designed for post-war work

position. This is accomplished quickly by pulling two pins. The blade can be raised a maximum of 50 in., or dropped 72 in. below the ground line. This movement is accomplished by means of a Caterpillar double-drum power control unit, using a single cable.

The unit is of all-welded construction, box channel frame, box plate blade, pressed and formed sections. The cutting edge has been reinforced with more bolts compared with earlier models, while the cutting bits at either end of the blade are single plates formed to fit the ends of the blade for greater wear resistance in rock cuts. Front overhead is a new design.

Welded Jaw Crushers

UNIVERSAL ENGINEERING CORP., Cedar Rapids, Iowa, has added a series of welded steel plate, roller-bearing jaw crushers, designated the "WRB" series. Two sizes are in production



Welded steel plate roller-bearing jaw crusher

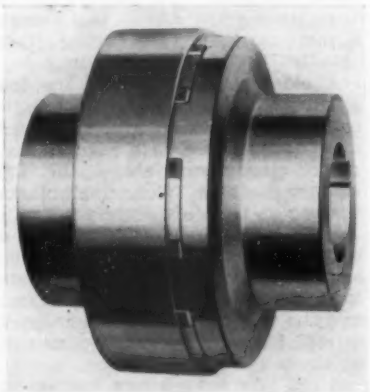
and other sizes will be added as conditions permit. One size has a 30- x 42-in. feed opening; and the other has a 20- x 36-in. feed opening.

Lateral and transverse ribbing and heavy plate side walls impart the structural strength necessary to prevent distortion of frame or misalignment of bearings. Four SKF roller bearings are used; two on the pitman and two on the frame, one on each side. Bearings are labyrinth sealed against grit and grease and are Alemite lubricated.

The WRB series employs the same crushing action as the first overhead eccentric crushers built by the company in 1906. Two crushing blows with each revolution of the eccentric shaft are produced by the high eccentric and radial toggle action: a primary blow at the top of the jaws and a secondary stroke at the bottom.

Flexible Shaft Coupling

LOVEJOY FLEXIBLE COUPLING CO., Chicago, Ill., has improved its L-R type C shrouded coupling. Protection against catching of worker's clothing or incautious handling is af-



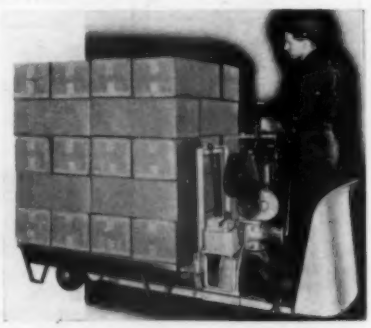
Coupling which protects workmen against catching clothing in moving machinery

forded by the outside steel collar which holds the load cushions in place. An extension of this collar which encircles the coupling, safeguards material and fingers from the heads of the bolts that secure the load cushion retainer.

The couplings are designed for heavy duty services from 4.60 to 806 hp. at 100 r.p.m. Individual free-floating load cushions between the rugged jaws, are held in position between an inside steel sleeve, and the removable steel collar.

One-Ton Power Truck

YARD-MAN INC., Jackson, Mich., has brought out an industrial haulage unit of one-ton capacity known as the Truck-Man. One of its features is a patented two-speed drive which makes both a low and a high speed instantly available. The low speed is adapted for starting, climbing ramps, going in and out of freight cars, etc. For light loads, the high speed is

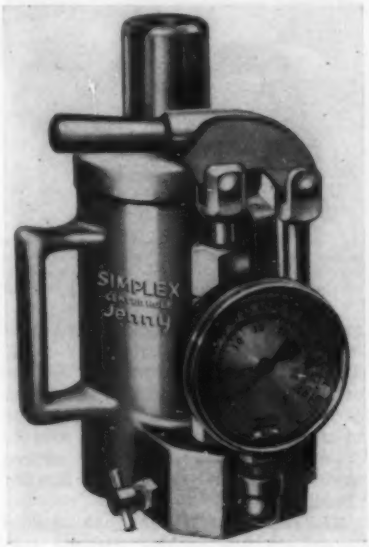


Haulage truck has two-speed drive

immediately available. Other improvements include a large ball thrust bearing for easier steering, and a more sensitive fly-bally type governor which replaces the old pneumatic type.

Hydraulic Puller

TEMPLETON, KENLY & Co., Chicago, Ill., has introduced its center hole, hydraulic puller to facilitate maintenance and repair jobs. The Simplex



Hydraulic puller can be used on many repair jobs

Jenny, as it is called, has been used for pulling bushings, cylinder liners, bearings, pistons, wrist pins, valve seats, keys, wheels, sprockets, gears, boiler tubes and pipes. It is also used to pull structural members together for welding or riveting. It can also be rigged up as a portable press. Five models are available, from 30 to 100 tons capacity.

Fire-Resistant Air Ducts

UNITED STATES RUBBER Co., New York, N. Y., has developed a fire-resistant asbestos product which has largely replaced metal from heating and ventilating air-duct systems of aircraft. This product undoubtedly will have many post-war industrial uses.

Welding, die casting, riveting, intricate metal processing, it is claimed, will be eliminated in the construction of air-duct systems. Metal fatigue, a bottleneck found wherever the metal duct system was used in aircraft construction, has also been excluded. Made of fabric, asbestos and a synthetic coating of resin, this new product makes possible the lightening of the material used on these heating and ventilating air-duct systems by more than 10 percent.

Concrete Curing

DEWEY AND ALMY CHEMICAL Co., Cambridge, Mass., has issued a new publication describing Daraseal, a new type concrete curing compound which is said to produce a continuous, transparent film of uniform thickness which is highly impermeable and effectively eliminates water and moisture-vapor losses from new concrete surfaces. This new compound is a blend of hydrocarbon gases of carefully proportioned molecular weights combined with high polymeric non-waxy materials which inhibit segregation and favor continuity and impermeability of the film. It is also said to resist abrasion of the concrete surface.

Electronic Relay

GENERAL ELECTRIC Co., Schenectady, N. Y., has developed an electronic relay for amplifying the very limited current transmitted by delicate control contacts or high resistance circuits, increasing the application range of many control devices.

Operated by any material having a resistance of from 0 to 500,000 ohms, or even greater if necessary, the new relay is said to be especially suitable for controlling liquid levels in tanks and boilers, sorting metallic parts by size, and as a limit switch requiring extremely light pressure to operate.

The relay consists of a standard type electronic tube, a supply transformer, and an electromagnetic relay—all mounted in a totally enclosed, weather-resistant enclosure.

In operation, the electromagnetic relay in the device is kept energized as long as the controls connected to the input grid circuit of the electronic tube remain open. The instant these contacts close, the relay is deenergized. A built-in time delay feature prevents chattering when the contacts in the input circuit are momentarily closed. A contact arrangement on the electromagnetic relay permits the device to be used either to make or break a load circuit when the actuating contacts connected to the input circuit on the electronic relay are closed.

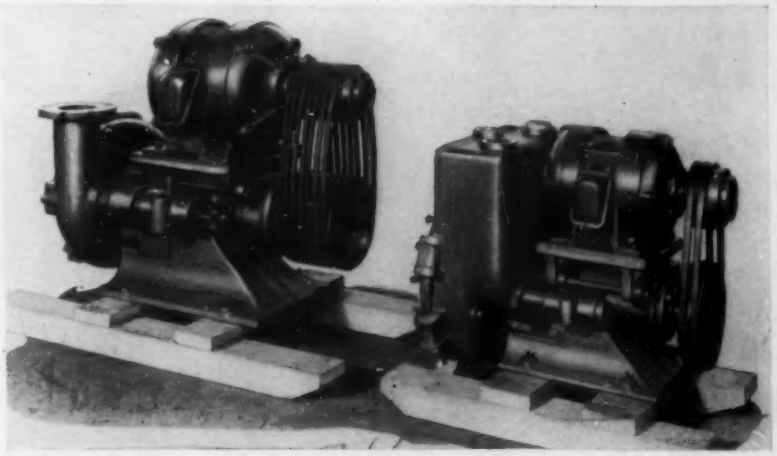
Electronic relay for use with control devices

Centrifugal Pumps with Motor Mounted Overhead

AMERICAN MANGANESE STEEL DIVISION, American Brake Shoe Co., Chicago Heights, Ill., has announced that Amsco-Nagle centrifugal pumps of the horizontal type are now available with the motor mounted overhead, as illustrated. Previously these pumps had been available with motor directly coupled to the impeller shaft or with V belt pulley, flat pulley or sprocket on the shaft.

This new mounting is said to offer the following advantages: pump can be operated at more accurate speeds; speed changes can be provided where the duty calls for such changes; and motor is located at a more accessible point and is at the same time protected against flooding.

The manufacturer's type A and type T pumps, both horizontal, may be obtained with this motor mounting. A 5-in. type T pump and a 2-in. type A are shown in the illustration.



Pumps with motors mounted overhead save room. To the left, is a type T, 5-in. centrifugal pump, and to the right is a type A, 2-in. pump

Phosphate Products

Cement Plant Making "Bone Meal"

Marquette Cement Manufacturing Co., uses cement kilns to calcine acidulated phosphate rock to remove fluorine

By NATHAN C. ROCKWOOD

UNDER THE TRADE NAME "Marquette Defluorinated Phosphate," the Marquette Chemical Products Division of the Marquette Cement Manufacturing Co., Chicago, Ill., is helping materially to meet a critical shortage in bone meal, very necessary to our present expanded livestock raising program. So successful has this producer been that not only has it now achieved a stop-gap for loss of cement production caused by practical stoppage of construction in this territory, but it probably has developed a permanently profitable side-line for its Oglesby (Ill.) plant.

Pulverized animal bone (bone meal) has long been used as a supplement to stock and poultry feed. Pulverized limestone is similarly used. Pulverized raw rock phosphate can not be used for this purpose, according to experts, because it contains too much fluorine, which in sufficient quantity, is toxic or poisonous. The present supply of animal bone, most of which used to be imported from South America, is nowhere near enough to meet demand, and much experimenting has been done to process rock phosphate so that it could be used as a substitute. The process employed by the Marquette Cement Manufacturing Co. is patented by the Davison Chemical Corp., and results in a product having an analysis of:

	Guaranteed	Actual
Calcium (Ca) minimum	21.2%	29 to 30%
Phosphorus (P) minimum	10.9%	12.5 to 13%
Fluorine (F) maximum	0.3%	0.08 to 0.12%
Ratio of Fluorine (F) to Phosphorus (P) maximum	1.40	

The cement plant was readily adapted to processing the rock phosphate, the only important addition being a new installation for making acid phosphate. However, the process of manufacturing superphosphate is well known, and has been standardized for many years. The acid phosphate produced here is not suitable for fertilizing purposes, but is produced strictly for the defluorinating process.

Acid Phosphate Plant

The plant for processing the rock phosphate is a hastily built, temporary timber structure, illustrated in Fig. 1. It is located near the far end of the cement plant as seen in Fig. 2, alongside a low storage building originally used to store kiln liner brick. This building now serves for storage of the acid phosphate for three days or longer, after which it is processed in the rotary cement kiln as will be described. Fig 3 shows the stored acid phosphate, ready for further processing.

Fig. 1: Acidulating plant with 25,000 gal. H_2SO_4 storage tanks on right and storage for acidulated phosphate in the background, to the left. Building was originally used to store refractory brick

Fig. 2: Partially defluorinated phosphate is hauled from the acidulating plant by 4-ton units and dumped into the boot of an elevator which carries the material to the kiln feed bin

The raw materials for making acid phosphate are 54 deg. Baumé sulphuric acid and Florida land pebble phosphate rock. The sulphuric acid is received in tank cars and stored in two elevated-horizontal tanks on concrete piers alongside the acidulating plant. From these tanks it runs by gravity to a two-compartment lead-lined wooden service tank, Fig. 4, inside the plant. Here the acid is slightly diluted with steam to 52 deg. Baumé. Steam is used for warming as well as diluting the acid.

From the wood service tank acid is pumped by one of two Labour 3-in. rubber-lined acid pumps to a weighing tank over a pug-mill type mixer, specially designed to hold the mixture a certain length of time, as well as to prevent it from balling up.

The Florida pebble phosphate is received dry in box cars and has the following average analysis:

Analysis	*Percent*
P_2O_5	35.33
Al_2O_3	0.87
Fe_2O_3	0.89
Soluble (Al_2O_3)	0.80
Soluble (Fe_2O_3)	0.89
CaO	49.62
MgO	0.14
F	3.76
SiO_2	7.40
MnO	0.033
Na_2O	0.14
K_2O	0.09
S (total as SO_3)	0.32
TiO	0.07

Fig. 2: Partial view of mill. Acidulating plant for phosphate rock may be seen between the stack to the left and the silos in the background

The pebble phosphate as unloaded is elevated to a storage feed bin over a Raymond high-side mill (Fig. 5), where it is pulverized and air separated to 90 percent passing 200-mesh. A 4-in. Fuller-Kinyon pump elevates the pulverized material to a feed bin over the weighing batcher which serves the mixer with accurately proportioned amounts of pulverized rock and sulphuric acid (about 55 rock to 45 acid by weight). To obtain the right proportions is very important to the further processing. From the mixer the material drops into a sealed compartment below, technically known as a "den," where the reaction between the rock and the acid continues (Figs. 6 and 7).

The reaction produces heat, steam, acid fumes and dust, so both mixer and den are tightly enclosed, so far as possible, and an exhaust fan carries the dust and fumes to a wood stack where water sprays bring these down in solution or suspension. This liquid is wasted. It contains about one-half the fluorine in the original rock, and probably some sulphuric acid. Eventually a use may be found for it.

From the den, the acid phosphate is removed by a slow moving pan conveyor, which discharges to an elevator feeding a belt conveyor extending 300 ft. through the storage building. At the end of the pan conveyor is a revolving "knife" which breaks up the material, to the consistency shown in the interior view of the storage shed. Here each day's run is stored in separate piles, and after at least three days, is in condition for further processing.

Defluorination Plant

After the curing period, during which reaction is apparently continuing, as a distinct odor is perceptible, the acid phosphate is loaded by an

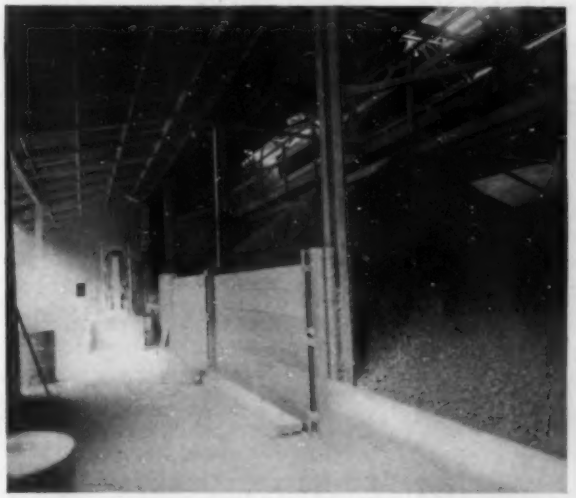


Fig. 3: Acidulated phosphate is aged under covered storage a minimum of three days. After it is acidulated, a conveyor overhead places it in storage where acid reaction continues

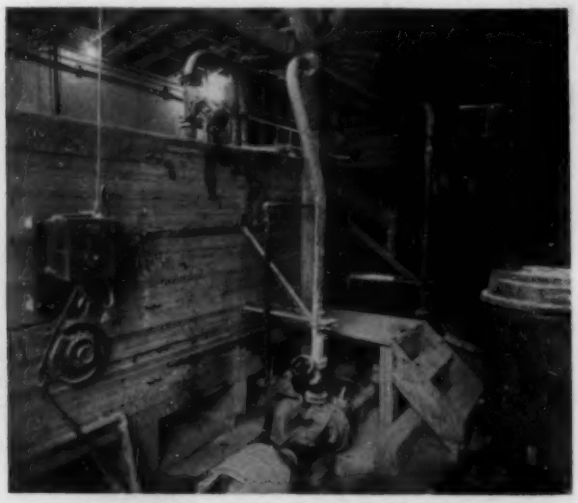


Fig. 4: Sulphuric acid vats in acidulating plant where acid is diluted for pumping through lead-lined pump to batching floor

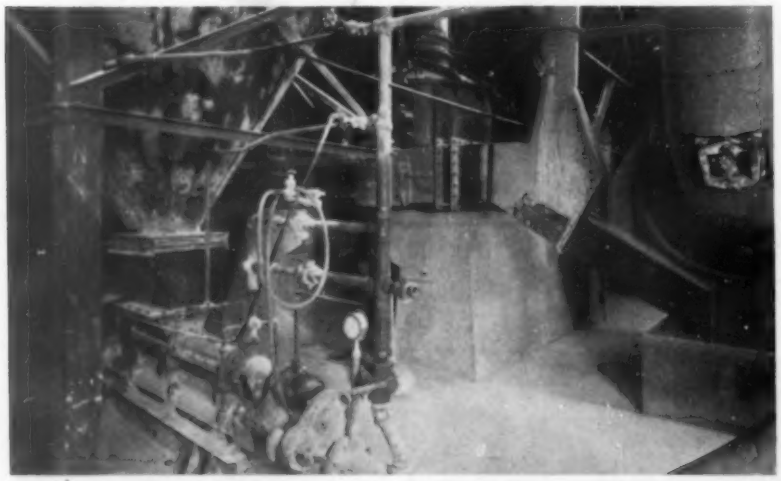


Fig. 5: Incoming pebble phosphate is pulverized to 90 percent minus 200-mesh by mill and then pumped to batching floor for acid treatment

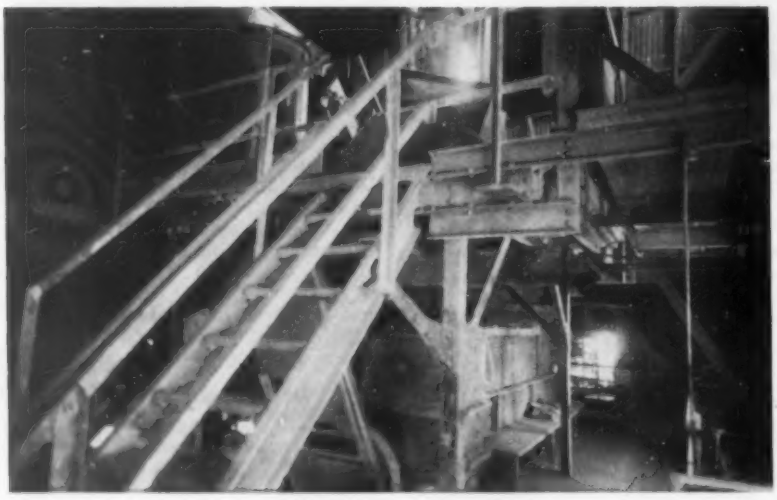


Fig. 6: Batching floor in acidulating plant. Above is constant level acid tank, to the right is batcher and below is pug mill mixer

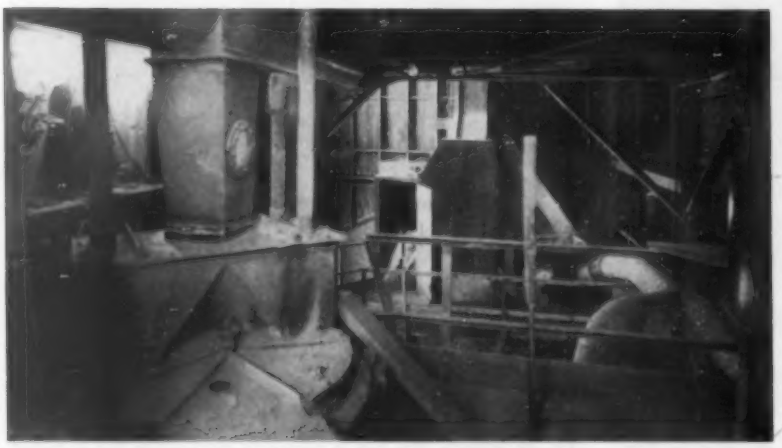


Fig. 7: Batcher for phosphate proportioning with sulphuric acid

Allis-Chalmers tractor scoop into Koehring Dumpsters, which haul the material across the yard to a hopper at the feed end of a 200 ft. kiln 11½ ft. in diameter, as shown in Fig. 8. At this stage the acid phosphate contains about half the original amount, or something like 1.7 percent of fluorine; in what form is not known, possibly as a heavy vapor of hydrofluoric acid (HF) and combined with silica as $SiF_4 \cdot 3H_2O$, which is probably also present as an adsorbed vapor.

The raw material for the calcination process, omitting the minor compounds of iron, silica, alumina, etc. is based on the following chemical reactions in the acid phosphate plant:

(1) $Ca_3(PO_4)_2 + 2H_2SO_4 + 6H_2O =$
Tribasis Phosphate of lime — Sulphuric Acid — Water

$CaH_4(PO_4)_2 + 2H_2O + 2CaSO_4 \cdot 2H_2O$
Monocalcium Phosphate — Water — Calcium Sulphate or Gypsum

(2) $Ca_3(PO_4)_2 + 3H_2SO_4 + 6H_2O =$
Tribasis Phosphate of lime — Sulphuric Acid — Water

$2H_3PO_4 + 3(CaSO_4 \cdot 2H_2O) =$
Phosphoric Acid — Gypsum

The free phosphoric acid in the second equation reacts with tribasis phosphate $Ca_3(PO_4)_2$ to form the monocalcic phosphate $CaH_4(PO_4)_2$, or acid phosphate, which is the desired product for kiln feed.

Before feeding to the kiln the acid phosphate is reduced to minus 1-in. size. The material goes through the kiln in small granules, and in a rather small stream for the size of the kiln, for it does not turn over like cement clinker—clinging rather closely to the kiln lining, which does not acquire a coating, and hence is relatively smooth.

The kiln turns 1 r.p.m., a little faster than when making clinker. The temperature is about 2400 deg. F.—much lower than clinker making temperature. In order to use pulverized coal, a small oil burner is placed under the coal burner to keep the coal ignited. The 11½ x 200 ft. Traylor kiln is probably larger than required for the calcination of the acid phosphate. It is operated in only two 8-hour shifts per day at present. About 10 tons per hour is the kiln output.

The calcined product is put through the rotary clinker cooler under the kiln, and by covered conveyors and elevators returned to the firing end of the kiln house, where it is put through a 30 x 24-in. Gruendler roll pulverizer, in closed circuit with two 3 x 6 ft. Productive Equipment Co., 2-deck vibrating screens, the top decks serving merely as scalpers. The product of the rolls and screens is

Fig. 9: Kiln making defluorinated phosphate

Fig. 10: Kiln cooler unit looking toward discharge end of cooler

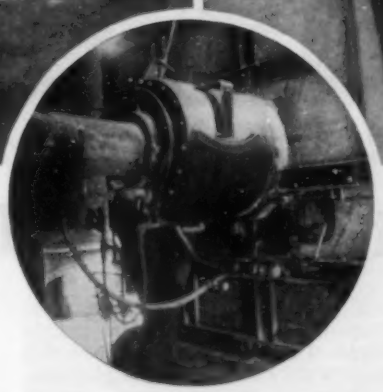


Fig. 11: Firing end of kiln for defluorinating phosphate

a white powder, minus 20-mesh, which is packed in 100-lb. paper valve bags on a standard Bates bag packer. All have to be appropriately tagged according to various state experiment station specifications.

Sodium Aluminate

Incidentally, defluorinated phosphate is not the only product being produced in a cement plant by the Chemical Products Division of the Marquette Cement Manufacturing Co. Another is a coagulant used in water treatment—a sodium aluminate, made by calcining a proportioned mixture of sodium carbonate (soda ash), a certain fire clay from Missouri, aluminum drosses from various operations and other aluminous raw materials.

Officers

The president of the Marquette Cement Manufacturing Co. is W. A. Wecker; vice-presidents are W. W. Dickinson, D. S. Colburn, and R. Moyle, Sr.; assistants to the president, L. W. Saxby and S. L. Cribari; secretary and treasurer, V. J. Hanley. The technical director is Dr. J. C. Witt, and the chemical director C. M. Butler. The general superintendent of the Marquette operations is Frank Moyle.

Build Crushing Plant

Crystal Rock Co., Crystal River, Fla., is now constructing a new crushing and screening plant. E. Lee Heidenrich, consulting engineer, is in charge of design and construction.

Change to Bulk Cement

The Sona Cement Products Co., Detroit, Mich., has recently converted its plant to handle bulk cement. Sand, gravel, and bulk cement will be hauled to the plant and dumped into bins below the ground level. Bucket elevators will take the material to a height of 62 ft. and dump into a three-compartment hopper directly above the mixer over the block machine. The changeover was occasioned by the labor shortage in the area. A new steam curing room is expected to be ready for use later in the year. George Sona and Sig Hatteberg are the owners.

Develop Pipe Ditch Tool

Jack Collins, president of the Collins Concrete & Steel Pipe Co., Portland, Ore., has announced that his company has developed a trench digger attachment for widening and sloping ditches for sewer and water works projects. Application has been made for patent rights.

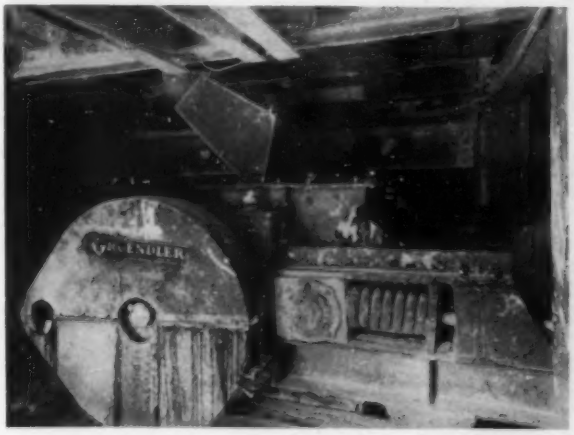
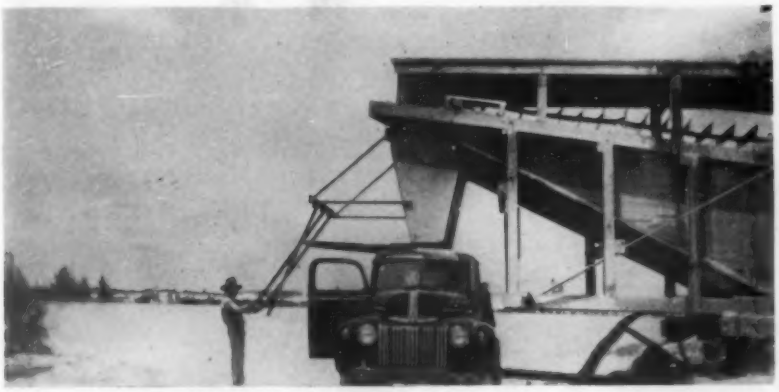


Fig. 12: Smooth-faced rolls for crushing finished product in closed circuit with screens

Fig. 13: Two double-deck screens in circuit with roll crusher produce minus 20-mesh product

Project Plants



Sand bin which is suspended at the end of sand drag structure with levers to operate compartment gates located within easy reach of man on the ground level

By W. E. JOHNSON

Southern crushed stone and sand and gravel producer constructs plant from equipment assembled from five plants to handle large war construction contract

Mount Plant on Track

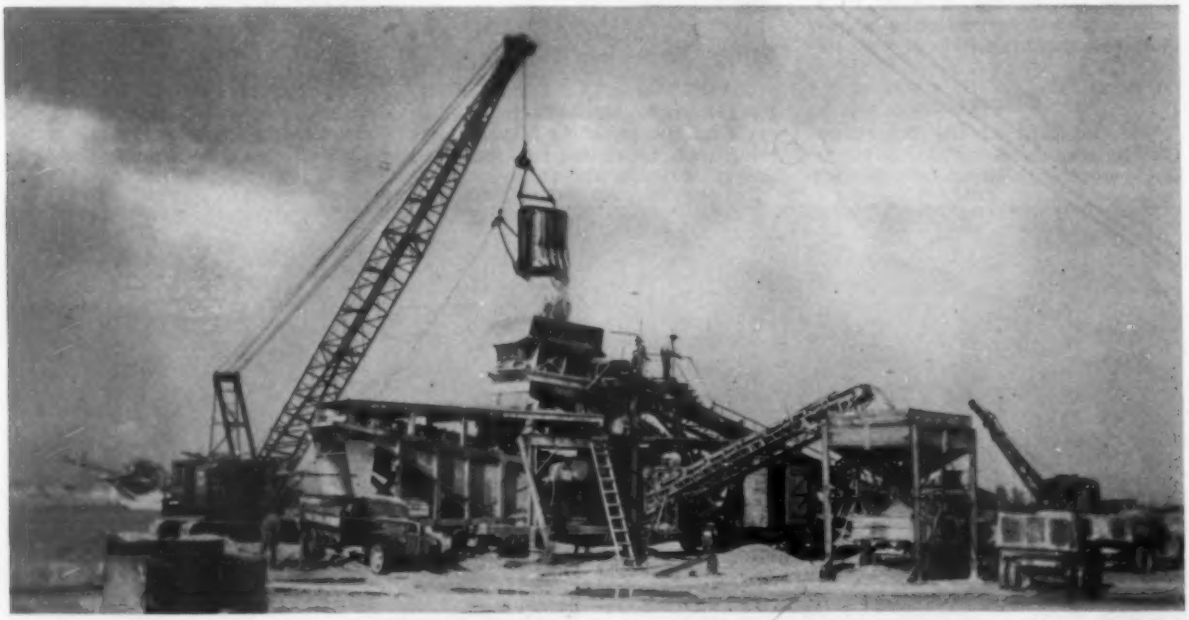
FACED with the problem of setting up a crushing, screening and aggregate washing plant in a minimum time, a southern aggregates producer gathered material and equipment from four plants in North Carolina and one in Florida. The job was complete and ready to run in 28 days from the day work was started.

The plant had some unique features. Although it was portable, the primary crusher was of a heavy type usually used in stationary plants. The 3- x 8-ft. apron feeder, 4- x 10-ft. three-deck screen, and 30-in. double-roll secondary crusher were taken from a Universal Pacemaker portable plant. Two flat cars furnished the foundation and traveling mechanism.

To move this equipment around curves up to 20 deg., the "A" and "B" conveyor frames and cat walks had 8-in. cut out above the car couplings, the electrical wiring was carried in flexible conduit, and the cars were chained together and the couplings blocked to prevent slack either way.

The double-roll crusher was placed crosswise near the end of the second car so that a 30-in. conveyor belt, 48-ft. centers, started directly under the 30- x 48-in. McLanahan & Stone single-roll primary crusher, and inclined up to the side of the car. Material was fed from a hopper to a stationary screen which scalped out the fines, by-passing them to the "B" conveyor starting under the secondary crusher and discharging on the receiving end of the 4- x 10-ft. Simplicity sizing and scalping screen, mixing with the original feed and making a closed circuit.

The flow of material was feeder to screen, oversize to primary crusher,



Crushing and screening plant in operation. Note truck at left under sand bin and truck under rock bin, to the right. Employes shown in the illustration are all Seminole Indians

minus top deck plus bottom deck to 24-in. conveyor belt "C," 40-ft. centers, to loading bin; or two sizes could be made and sent by "C" and "D" conveyors to two truck loading bins. Minus 3/16-in. went to a 4- x 27-ft. Link-Belt sand drag. The discharge from the primary crusher went to conveyor "A" and thence to scalping grizzly, dumping to secondary crusher, the product of which went by way of conveyor "B" to screen. A 54-B Bucyrus-Erie Diesel-powered dragline with an 80-ft. boom was used to feed the plant. To prevent large pieces of rock from getting into the sand drag, it was covered the entire length.

Electric Power to Drive Portable Plant

Electric power drives the plant equipment. An overhead power line was run into about 200 ft. of the first point of operations and 220- and 440-volt rubber-covered cables were laid on the ground to the plant. The 300 hp. provided for was ample as the normal load was about 225 hp.

A 4- x 5-in. Byron-Jackson pump furnished 700 g.p.m., for washing rock and classifying sand. This would be inadequate for dry material, but the deposit was limestone which was excavated below water level with a solid bucket.

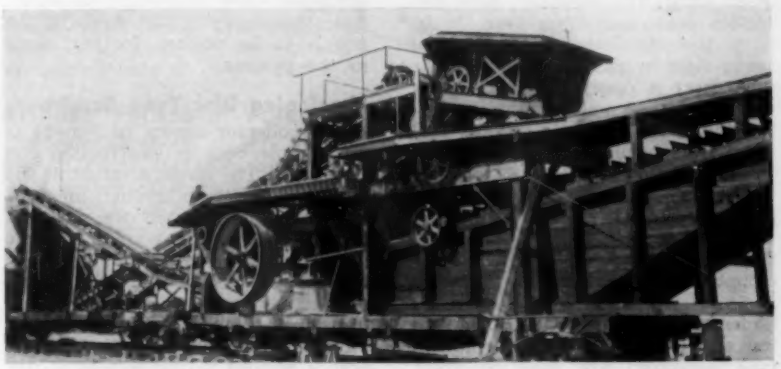
Easy to Move Plant

About one hour was required for moving the plant 75 to 80 ft., which had to be done about every fourth day. A Caterpillar D-8 tractor placed a bulldozer blade against a corner of a car and pushed the plant easily. After the main plant was in the new location, the tractor drew the truck loading bin under the conveyor, the pipe line was connected up and production was then resumed. Peak production was approximately 150 cu. yd. per hour.

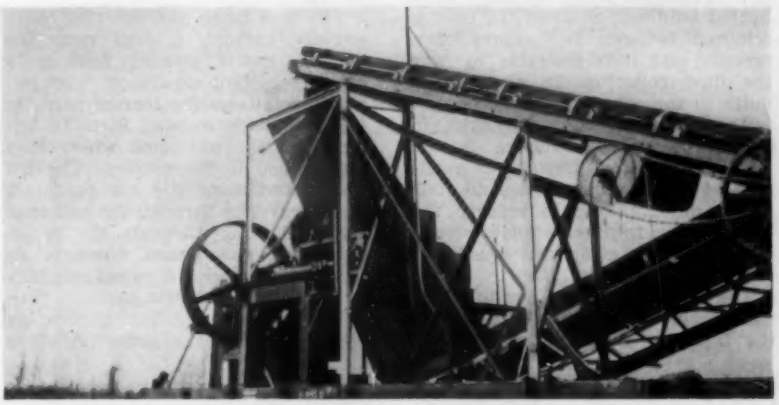
Originally, the primary crusher feeder was set up on a 15-deg. incline as in the Universal portable plant, but later, due to spill, it was raised so that the receiving end was about 6 in. higher than the discharge. The sides away from the pit were built up 24 in., and a "bath tub" was built under it with grizzly bars having 18-in. openings placed across the top. The "C" conveyor was suspended from the screen supporting structure by means of four ½-in. cables. Jack beams were built in with the feet level with the rail top, under the feeder. They were blocked up tight on the first set, but since then have been left loose.

To the right: Arrangement of secondary crusher and scalper, permitting the location of "A" and "B" conveyors under crushers and facing each other on the flat cars

Construction crew in front of primary crusher, triple-deck screen, and receiving end of "C" conveyor. W. E. Johnson, author, is shown third from the left



Plant under construction. This is a close-up of the feed side of the plant



Construction view, showing arrangement of double-roll crusher, scalping grizzly, and "A" and "B" conveyors

Control and Collection of Industrial Dust

Part 7: Wet scrubber type dust collectors

By E. D. POWERS

THERE is a wider range of designs covering wet scrubber dust collectors than any other type. Probably the simplest is the vertical tower style in which the wash water flows over a distributor plate, cascading downward over a series of impinging plates against a counter current of upcoming dust laden gas. There are also a variety of types in which the gas passes through spray caused by the water being atomized through nozzles. They are usually in the form of towers or rectangular chambers, in some cases the design is governed by the space available. Sometimes, where space is at a premium and power cost low, the rotating type scrubbers are used to great advantage. This is also true when the equipment must be kept in a heated building, or when the dust is removed between two stages of a process, and it is desirable to have the dust collection in close proximity to the processing equipment.

The main decision, of course, in considering wet scrubbers, is the question of water. If water is available at a reasonable cost, and it is not a disadvantage to recover the dust in the form of sludge, scrubbers should be given full consideration.

The possible troubles due to freezing should be remembered and also the fact that some materials when wetted or put into solution are very corrosive. Dry collection is sometimes necessary if the heat in the gas is to be utilized further along in the process.

Impinging Disc Type Scrubber

The collector shown in Fig. 29 is very simple, both in construction and separation. The water, or other washing liquor entering through an open end pipe, is distributed over the first impinging disc. The counter current stream of gas atomizes the liquid as it cascades over the successive impinging plates, and also causes it to form a wet film on the shell, the impinging plates and vanes. The trapped dust is washed to the bottom of the unit and leaves through a sludge outlet.

The dust laden gas, entering tangentially through a duct near the bottom, swirls around forming a primary cyclone separator. This action precipitates the coarser particles to the outside causing them to impinge on the wet shell where they are washed to the bottom. The rotating motion of the gas continues on its travel up through the collector. Before leaving through the outlet duct, the gas passes through an eliminator, where the excess moisture is separated from the gas.

There are no moving or wearing parts in the collector proper. Another important point is the elimination of spray nozzles which often cause trouble through plugging and require a higher pump pressure for atomization, with consequent greater power consumption. The liquid in this case enters the collector at no head pressure and travels by gravity down to the bottom. The liquid requirement should not exceed about 3 gal. per 1000 cu. ft. of gas, at 70 deg F. If hot gas is treated allowance should be made for additional liquid consumption. An additional 3% should cover evaporation losses. The water or other liquid is usually recirculated in which case de-watering equipment is required. In figuring power consumption in comparison with other types of collectors, the fan and pump motors should be considered. There are often two pumps —one for handling sludge and one for recirculating the liquid.

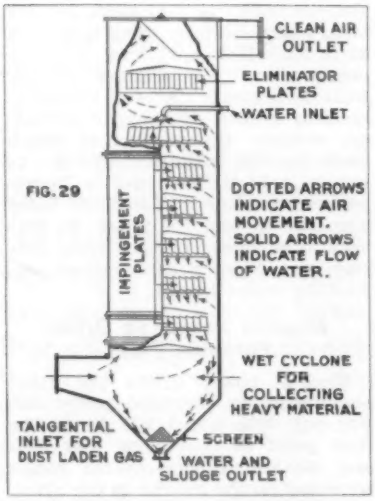


Fig. 29: Impinging disc type scrubber

The collection efficiency may be very high in a wet scrubber, in some 99.7%. Dust varies in wettability and that point should be given serious consideration.

Spray Nozzle Type

There are many variations of the type shown in Fig. 30. They consist essentially of a series of spray nozzles which atomize the water. The dust laden gas passing through the mist is washed, the clean gas passing through a series of baffles or eliminator plates where excess moisture is removed. The resistance through this type equipment may be as low as ½ in. W. G. The fan is usually placed on the clean air side to avoid wear through abrasion. This type of equipment is also used extensively in conjunction with air conditioning systems for offices, theatres, etc.

The wet collector shown in Fig. 31 uses a high speed wheel for atomiz-

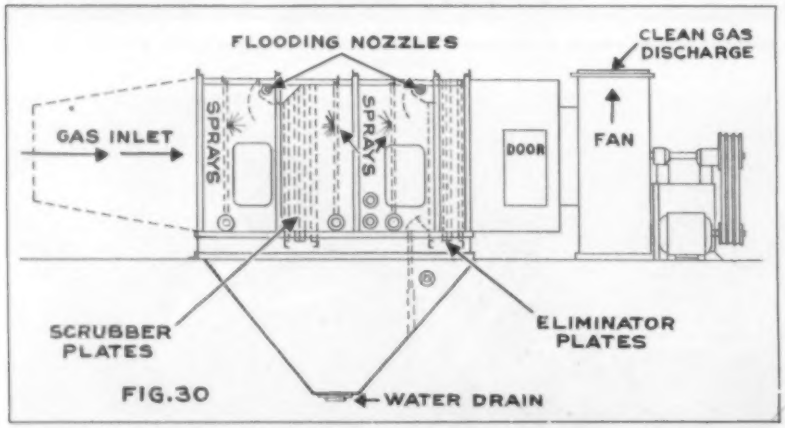


Fig. 30: Spray nozzle type dust collector. Cleaned gas passes through series of baffles where excess moisture is removed

ing the liquid. A fan forces the gas into the bottom scroll where the preliminary concentration of the dust takes place. The sprayer is placed at the entrance of the converging cone and the gas must pass through the sheet spray before entering the cone. The friction of the gas in its upward swirling passage, carries a film of liquor up the sides of the cone, completely wetting the surface of same. The centrifugal force precipitates the dust particles and causes them to impinge against the wetted inner surface of the cone, where they are washed to the bottom. This collector is very effective on some fine dusts, and is generally used after some other type collector for final cleaning of the gas or recovery of fine dust. The location of the fan on the dusty side of the collector is not serious with fine non-abrasive dusts.

Self-Contained Collector

A rather new development is shown in Fig 32. The collector is self-contained, with washer, de-watering equipment, fan and pump assembled as a unit.

The high speed rotor picks up water and blasts it against an impingement plate. The incoming dust laden gas must first pass through the vertical curtain of water falling from the plate, and then through the horizontal sheet between the rotor and the impingement plate. This design is free from spray clogging troubles and does not require screens or filters as there are no small orifices through which the water must pass. Eliminator plates can be installed at the discharge side of the unit to remove excess moisture from the gas.

Many other types of rotary dust collectors are on the market. They generally follow the design of fans or blowers with the addition of sprays or water jets for capturing the dust. Some are the multiple stage design and many are in use in very large units for scrubbing operations in gas plants and steel mills.

In recent years, wet scrubbers have come into more general use for small installations, and there has been a tendency to produce self-contained units of simple design.

Higher Feldspar Value

BUREAU OF MINES reports that domestic crude feldspar produced in 1943 amounted to 308,180 long tons valued at $1,646,277. While this represents a decline of about three percent in quantity below 1942, the value was six percent greater than in 1942. Ground feldspar sales advanced to 335,810 short tons valued at $3,591,960, two percent higher in quantity and value than in 1942. This active rate of production, however, was maintained only by seriously depleting stocks of crude spar normally held in reserve as well as processing currently mined material. Of marked significance in the current activity of the feldspar industry was the increased demand for glass, particularly glass containers, the most important market for feldspar.

According to the Bureau of Mines, the post-war outlook for feldspar is favorable. It is expected that there will be increasing markets for glass products after the war. Porcelain also is taking increasing quantities of feldspar. A very heavy demand for enameled products is expected to follow the war for stoves, refrigerators and kitchen equipment in which feldspar takes a prominent part.

Another favorable factor is the recovery of feldspar by froth flotation. This process has been developed for separation of quartz and feldspar, with encouraging results. Two plants whose primary produce is spodumene also have been recovering feldspar by this method.

Open Granite Quarry

HARRIE HILL and D. O. Robertson of Yakima, Wash., have made arrangements to begin quarry operations in July at a location one mile East of Pateros, Wash. The quarry property has been leased from D. J. Nickell. Three other locations also have been leased in this area. Although the granite will be quarried primarily for monument purposes, a crushing plant is to be set up for the purpose of grinding quarry waste rock into poultry grit.

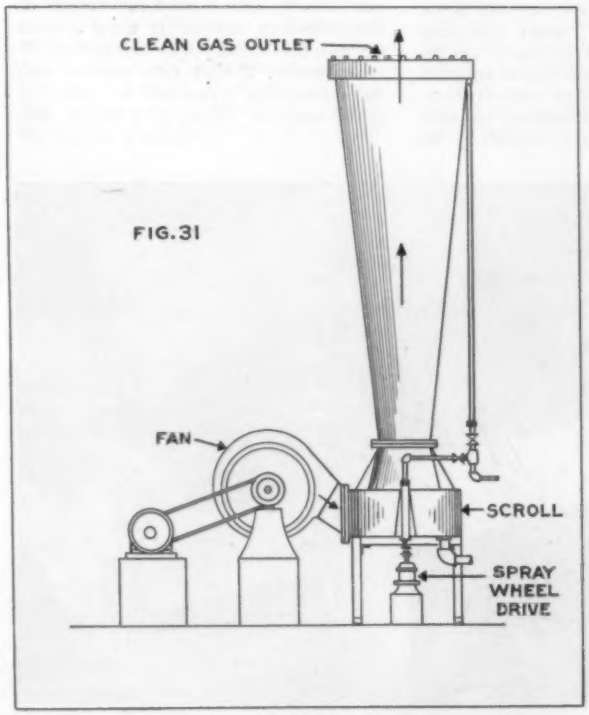


Fig. 31: High speed wheel atomizes liquid. A fan forces gas into bottom scroll where preliminary concentration of dust takes place

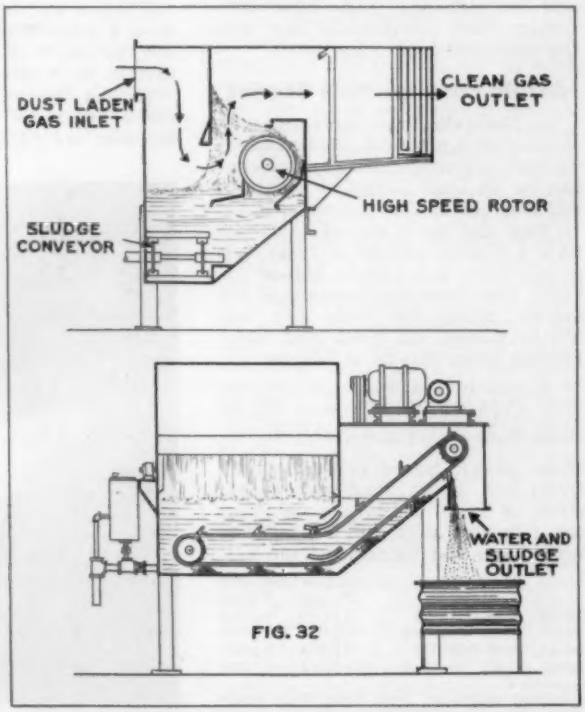


Fig. 32: Self-contained collector with washer, dewatering equipment, fan and pump assembled as a unit

Practical Conveyor Belt Operation

Part 10: Calculating belt stress to determine number of plies; and relative operating costs of different belt widths

By MELVIN C. DOW* and HARVEY A. HARNDEN†

WHEN the amount of power has been calculated the belt stress should be figured to determine the number of plies needed. In doing this, we should figure the stress when the belt is driven by a single pulley and when driven by tandem pulleys. If the power amounts to 10 hp. or more, lagged pulleys only should be considered. The type of drive, whether single or tandem, will have no effect on the power required, but will affect the strength of the belt needed. When a tandem drive is used a lighter belt is required so that the additional cost of the tandem drive should be compared with the savings in the cost of the lighter belt.

At this point, we are able to make a comparison of the first costs of several different installations without the drive; that is, without the motor and reduction method. If the anti-friction idlers show a lower first cost they would obviously be used as the power will also be less. If not, then we must consider the power saving and maintenance costs with anti-friction idlers and compare these with the increased cost of the idlers.

Anti-Friction vs. Plain Bearing

To illustrate these statements let us consider a practical problem where we wish to convey crushed stone containing no large lumps at a rate of 600 tons per hr. The conveyor is 427 ft. long and has a rise of 45 ft. We have a choice between a 30-in. belt at 381 f.p.m. and a 36-in. belt at 257 f.p.m. The power requirements at the driving pulley for these two belt widths carried on plain and roller bearing idlers will be as follows:

30-in. Anti-friction idler	41.6 hp.
30-in. Plain bearing idler.....	56.5 hp.
36-in. Anti-friction idler	41.0 hp.
36-in. Plain bearing idler.....	55.3 hp.

If we assume lagged pulleys without snubs and 36 oz. duck with a safe stress of 30 lb. per in. per ply, then the following plies will be required with single and tandem drives:

	Single Pulley	Tandem Pulley
30-in. Anti-friction ...	6 plies	5 plies
30-in. Plain bearing ..	9 plies	7 plies
36-in. Anti-friction ...	8 plies	6 plies
36-in. Plain bearing ..	10 plies	8 plies

All of the above possibilities have the minimum number of plies to support the load but 9 plies in the 30-in. belt and 10 plies in the 36-in. belt exceed the maximum number for proper troughing and so a heavier duck would be needed in these two. In which case 7 plies and 8 plies, respectively, of 42-oz. duck would be required. However, for a cost comparison in this instance all belts will be figured on a basis of 36-oz.

A cost comparison between the anti-friction idlers and the plain bearing idlers shows that the anti-friction equipment will cost about $600 more than the plain bearing type, but since three additional plies would be required at an additional cost of $1,100 it is obvious that the 6-ply belt with anti-friction idlers will be $500 less for the original first cost. When we realize that ordinarily the idlers will outlast several belts, even a considerably higher first cost for the idlers would be made up by savings in future belt replacements.

Having decided that anti-friction idlers are more economical in this instance we turn our attention to the comparison between the costs of a 30-in. and a 36-in. belt. It can be readily seen that the first cost of the machinery for a 36-in. belt will be greater than for the 30-in. belt, and since the power requirements are nearly the same for both widths, any economy shown by the wider belt will have to be shown by longer wear. If we assume that either belt can be properly loaded with equal facility then the wearing qualities of the two will be approximately proportional to their widths.

The 36-in. belt at 257 f.p.m. travels about 33 percent slower than the 30-in. belt. On this basis alone it should have one-third longer wear. The 36-in. belt, however, is 20 percent wider than the 30 in. belt, and on this basis would cost 20 percent more. Our problem now is to determine whether the increased theoretical wear more than offsets the additional cost of the wider equipment. While 33 percent longer life for 20 percent additional cost might seem a good investment if the expected service is only a year or so, the theoretical advantage is meaningless if the belt service can be reasonably expected to last for many seasons. Thus, if a 30-in. belt

(Continued on page 76)

Limited head room was responsible for this poor loading condition. Belt wear is beyond control of the operator, and the only remedy is in extensive structural alterations

*Chief engineer, New York Trap Rock Corp., Newburgh, N. Y.
†Formerly with Engineering Department, New York Trap Rock Corp.

Calcination Control for High Calcium and Magnesium Limes

By VICTOR J. AZBE

GOOD LIME has an exquisitely fine, delicate, sort of honeycomb structure which is destroyed by high temperatures. Therefore, lime can not be at its best except when it is burned at minimum temperature, and minimum temperature can not be maintained effectively in ordinarily arranged kilns without greatly impairing their producing capacity and their fuel efficiency.

There were many schemes devised to correct this and to obtain low calcination temperatures. There was the Eldred Process which reinjected gases from the kiln top into the hot zone. In other plants steam was used for the same purpose. Similar effects were achieved by maintaining a state of incomplete combustion, or by the use of large amounts of excess air. Still others did not bother with any of these schemes, but just drew lime containing much core. With all of these, before the desired condition was attained, performance was impaired to the uneconomic point, and there followed either reversion to former practices, or to a modified operation which always fell short of attaining the desired end. All of these attempts were wrong in the *fundamental principle which demands conservation of heat of high elevation for purposes of calcination.*

Lime is ordinarily burned in a *"low volume of high temperature gases"* while it should be burned in a *"high volume of low temperature gases."* However, in attaining this high volume and low temperature there must be no violation of the principle of conservation of heat of high elevation. The end must be attained without the loss of any of this heat which heretofore was never done except by this new system.

Kilns of today are generally not very uniform as to heat, lime flow and gas flow, and far too hot in one section, too cool in another section; therefore, lime coming from one point may be badly overburned and from another underburned, the latter containing both core as well as reabsorbed CO_2 in its recarbonated portions. Fig. 1-A shows only a mild form of irregularity of isotherms, which ordinarily is far more severe.

As a result, lump lime itself, as also the hydrate made from this lime, lack the full quota of desired characteristics for chemical purposes, such as proper solubility, reactivity, availability and settling rate; and in the construction field, of body, plasticity, workability, sand carrying capacity, fill-in power, adhesiveness, etc. This is particularly true of dolomitic lime which, in addition to increasing difficulties of application, tends occasionally to give trouble often many years later, through pitting or blistering of finish coat plasters, and for the elimination of which manufacturers have expended many hundreds of thousands of dollars without attaining an all around satisfactory solution.

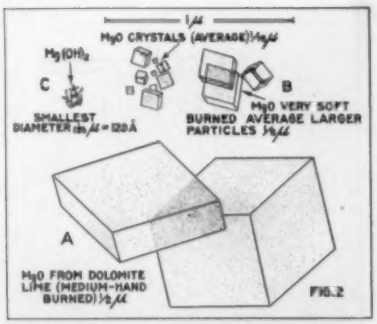
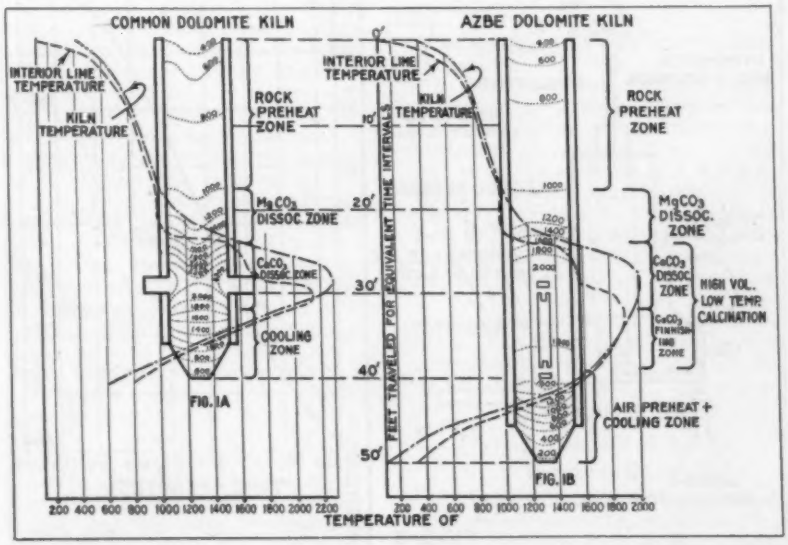


Fig. 2: Electron micrographs to show size contrast between the crystals of magnesium oxide and magnesium hydroxide burned under various temperature conditions

Effect of High Temperatures on Dolomitic Lime

Dolomitic lime is particularly sensitive and readily damaged by high temperature because dolomitic lime has two main components, one of which—the magnesium oxide—forms at much lower temperatures than the other—or calcium oxide. When exposed to heat magnesium oxide crystallizes into dense cubical crystals. At higher heat and longer time of exposure in lime kilns these crystals grow to a relatively much larger size. Due to their density any hydrating action can take place only at the outer surface, and due to the large size (Fig. 2-A) there is but little outer surface available. As surface is needed for activity, lack of this surface makes the magnesium portion of the lime relatively inactive and almost completely unavailable with the likelihood of delayed activity at an undesirable time.

At lower temperatures of calcination the smaller cubical crystals form, Fig. 2-B, which, although dense, present a greater outer surface area. With more exposed surface the rate of hydration—a surface reaction—increases proportionately, and the resulting dolomitic hydrate, rather than being composed in a great measure of the inert large crystals of MgO, has a good proportion of the



Thermal comparison between two types of kilns. Fig. 1-A: is a common type dolomite kiln which shows only a mild form of irregularity of isotherms. Fig. 1-B: Dolomite kiln with calcination control

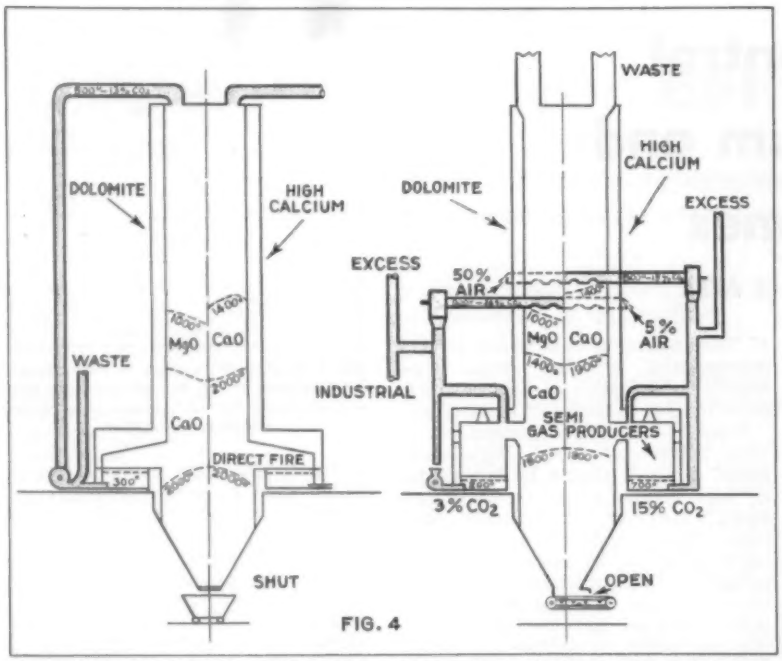


Fig. 4: Contrasting two systems of calcination. Eldred system to the left, and right, Azbe system to the right

very minute $Mg(OH)_2$ crystals shown to the same scale in Fig. 2-C.

The fundamental masses of the calcium oxide component of lime, if not formed at overly high temperatures, are smaller than those of magnesium oxide and, what is even more important, are more porous. They thus have both an internal as well as external surface, and through this a very much greater total surface, which explains their far higher hydrating rate.

Calcium oxide is also impaired by elevated temperatures but not as much as magnesium oxide. This is mainly due to two reasons: the first being that its tendency is not to form large dense crystals but rather those of a smaller and more open type; and secondly that calcium oxide is normally never heated to such high excess temperatures above its dissociation level as magnesium oxide which dissociates at about 1000 deg. F., but may pass through the kiln hot zone at a temperature of 2500 deg. F., or practically 1500 deg. F. in excess.

Since dolomitic lime is harmed more by high temperatures than high calcium lime, most of the studies were given to it; they consisted of extensive theoretical investigations, laboratory experiments, and full scale field trials, the findings of which are the basis of this development. But while the dolomite lime kiln is here being emphasized, all of the features are almost equally applicable to a high calcium kiln. The system in all main aspects is either patented or patents have been applied for.

The full scale trials have proven that dolomitic lime hydrate made from the Azbe controlled calcination process will accept water immediately, eliminating the long period of soaking ordinarily required. It will give a putty of the desired body and one without granulations. Such putty, it is claimed, will have virtually im-

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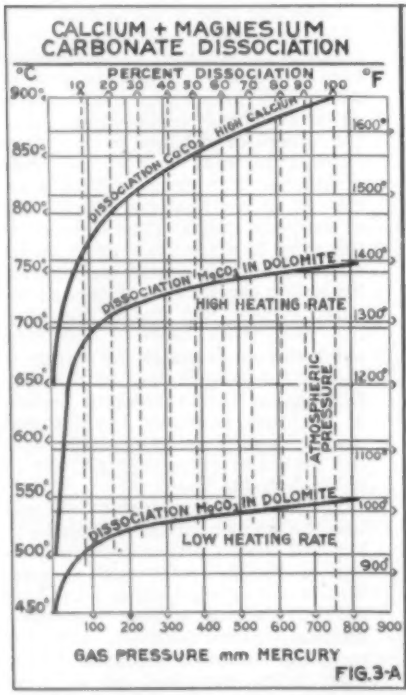

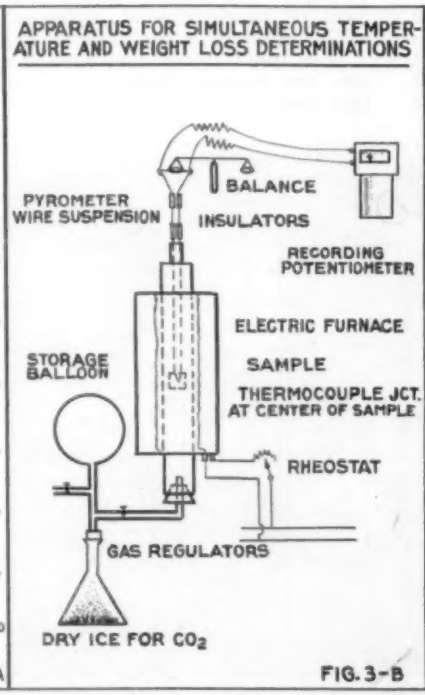

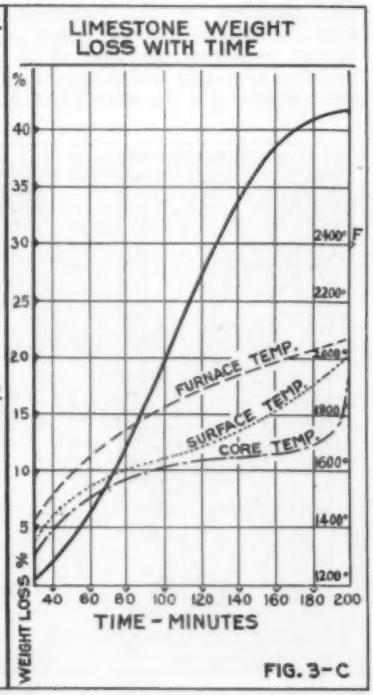

Fig. 3-A: Showing two dissociation temperatures of magnesium carbonate of dolomite. Fig. 3-B: Laboratory experiment to establish lower dissociation temperature for the lower heating rate. Fig. 3-C: Graph showing limestone weight loss with time of heating

Newly ballasted double-track on the Chicago, Rock Island & Pacific Railway near Valencia, Kansas

Requirements for Principal Railroads

Producers of gravel, crushed stone, and slag are busy getting out large tonnages of railroad ballast under new specifications

By BROR NORDBERG

BALLAST specifications of 46 railroads, representing 74 percent of the total line mileage in the United States and Canada, have been reviewed by the ballast subcommittee of the American Railway Engineering Association in order to determine the degree of conformity with the A.R.E.A. recommended standards. A summary of the replies in response to a request for information, for quality requirements only, revealed that most of the formal specifications are consistent with the spirit of the A.R.E.A. recommendations although relatively few of the railroads have incorporated the recommendations bodily in their own specifications.

One general finding in the case of stone ballast, was that most of the specifications give only the limiting sizes in their grading requirements, with no intermediate grading requirements. On the surface it would appear that the specifications are more liberal than A.R.E.A. requirements, but the subcommittee concluded that, with few exceptions, materials meeting the limiting size requirements would fall within the A.R.E.A. recommended intermediate limitations.

In the case of gravel specifications, a greater diversity of opinion was found in grading requirements, but, generally, recommendations are in line with the spirit of the A.R.E.A. recommendations, in the opinion of the subcommittee. It was concluded, from a summary of the returns, that many of the reporting railroads could purchase their ballast by referring to A.R.E.A. specifications with appropriate qualifications to meet local conditions. It was suggested, by the subcommittee, that railroads should be urged to determine if such a procedure would not be acceptable.

Trend Toward A.R.E.A. Specifications

A detailed summary was made of the replies and the accompanying tables were drawn up in an attempt to compare specification requirements, principally grading, with the A.R.E.A. recommendations. Each reporting railroad was assigned a number and detailed replies from each were summarized and printed. All the replies cannot be printed here, but a few of the most interesting remarks in reply to the questionnaire are briefly mentioned in the following:

One railroad requires that crushed river gravel ballast have not less than 80 per cent of crushed particles. Another railroad specifies that crushed stone have a minimum specific gravity of 2.80 and a compressive strength of at least 1500 p.s.i which would probably admit only trap rock or a heavy limestone.

One railroad reported unsatisfactory experience with A.R.E.A. specification gravel and that ordinary pit run gravel was substituted on a government sponsored job with much better results. The reporter in this case said that he would recommend, in a specification for gravel ballast, that a little more sand be added and a little dirt (not clay). His reason for this statement was that A.R.E.A. specification gravel gets to be better ballast after a few years' service be-

cause enough dirt gets into it to keep it in place and yet not enough to block drainage. This railroad, by the way, was the only one to criticize A.R.E.A. specifications.

In the case of another railroad, washed gravel ballast is required to contain "sand" from 15 to 20 percent of the volume of the ballast. Pit run gravel ballast is limited only by the requirement of "not more than 2 percent dust and/or 40 percent sand."

Still another railroad specifies that stone ballast shall be screened in a revolving screen. Another railroad reported that gravel specifications are written differently depending upon sources of supply. In still another case, "bar run gravel ballast" is required to pass a 2½-in. ring and to contain sand in the amount of 30 to 40 percent through a 10-mesh sieve.

The foregoing are but a few highlights taken from the summary. The accompanying tables show additional remarks and summarize the various specifications and their differences, or relation, to A.R.E.A. recommendations.

Interview Engineers

The editors of ROCK PRODUCTS also interviewed the engineers of several leading railroads to learn first-hand some of the considerations in purchasing ballast. The following information briefly illustrates how some of the practices differ.

A railroad operating lines through the northwest follows A.R.E.A. specifications as closely as is practicable with available sources of supply. A small top size for gravel ballast (¼- to 1¼ or 1½-in) is preferred because, in the opinion of this railroad's chief engineer it is easier and cheaper to maintain track, particularly where minor raises or movements are made, when smaller size pebbles are used. A coarse "sand," with most of the fines removed, is put into the gravel ballast up to 30 percent of the volume.

Good gravel ballast will last five years, according to this engineer, before it becomes contaminated to the point of requiring replacement. He would prefer a 100 percent crushed gravel ballast if he could get it. Chats, dolomite from a railroad-owned, contractor operated plant, and a natural-burned shale in the West are also used.

This railroad has enlisted 2000 Mexican Nationalists for track maintenance work to solve its manpower needs and would be able to place more ballast this year if greater production was available. A few of the other railroads, incidentally, have Mexican Nationalists on their roads.

A midwestern railroad has had success for many years with pit run gravel ballast under heavy service conditions. According to the chief engineer, the fine sand fills the pores and makes it difficult for dirt to enter. In this case, there are high quality gravel deposits available at many points along the line. A limited amount of crushed stone ballast is specified for bridges where it is impossible to build up the normal depth of road bed.

A third railroad, operating through the East, uses crushed limestone ballast except for a few hundred miles at the west end where high quality glacial gravels are available. Some slag is used in the Pittsburgh area. Stone ballast has been found to last five years before a major raise is necessitated and the gravel lasts three years. According to the chief engineer, only one year's service was obtained under wartime traffic conditions when a certain gravel ballast

(Continued on page 59)

TABLE 1—SUMMARY OF SPECIFICATI ONS FOR CRUSHED STONE BALLAST

Railroad No.	General	Requirements: Grading	Conforms to or Met in Principle by AREA Grading Number
1	Current AREA	¾—2 in. (rd)	No. 4 in principle
3	Hard, sound, etc.	⅜—2½ in. (rd)	No. 4 or mixture of 3 and 5 in principle
4	Specific limitations on weight, toughness, soundness, abrasion	¾—2 in. with intermediate limits (sq)	No. 3 substantially
5	Specific limitations on weight, toughness, soundness abrasion	¾—2 in. with intermediate limits (sq)	No. 3 substantially
6	Specific limits on weight, absorption, toughness, abrasion, soundness	¾—2¾ in. (rd)	No. 24 in principle
7	Hard, durable, etc.	½—1 in. and 1—2 in. sq.	No. 5 in principle and No. 3 substantially
8	AREA	⅜—2½ in.	Mixture of No. 3 and 5 in principle
9	Crusher run novaculite	1 in. maximum with 30% minus No. 4	None
11	Durable enough to resist disintegrating influence of climate where used	¾—2¼ in. (rd)	No. 3 or 4 in principle
13	Specific limitations on specific gravity and compressive strength	1¼—2⅜ in. (rd)	No. 3 in principle
14	Source	1-1/16—2¼ in. (sq) and ½—1¼ in. (rd)	No. 3 and 5 in principle
15	Disintegrated granite	⅛—1¼ in.	No. 57 in principle
18	AREA	½—1½ in.	No. 4 in principle
19	Trap rock	Typical grading given	No. 5 substantially
20	Hard and durable limestone rock	½—1½ in. (rd)	No. 5 substantially
21	No specifications; use material from company owned pits		
23	Trap rock of an acceptable quality; "high in weight, hardness, strength, and durable but low in absorption and cementing qualities." Limits on dust, clay lumps and soft fragments	1—2½ in. (rd) and ¾—1½ in. (rd)	No. 3 and 4 in principle
24	In accordance with 1928 AREA Manual	¾—2½ in.	No. 24 in principle
25	In accordance with AREA recommendations current in 1936	¾—2½ in. and ¾—1½ in. (rd)	No. 4 and 5 substantially
26	None	½—2½ in. (rd)	Mixture of 3 and 5 in principle
27	AREA substantially	¾—2½ (sq)	No. 24 in principle
29	Source	1¼—2¼ and ½—1¼ in.	No. 3 and 5 in principle
30	No formal specifications; free from dust, rubbish and dirt	¾—2½ (rd)	No. 4 in principle
31	Hard, tough, durable trap flint or limestone	1—2½ in (rd)	No. 3 in principle
32	Based on 1929 AREA Manual	½—1½ in. and ¾—2½ in. (rd)	No. 5 and 4 in principle
33	Based on 1929 AREA Manual	¾—2¾ in. (rd)	No. 24 in principle
34	Based on AREA specifications current in 1934		
35	Based on AREA specifications current in 1938		
37	Based on AREA specifications current in 1937		
38	Hard and durable	¾—2 in.	No. 4 in principle
39	Based on current AREA recommendations	¾—2 in. (sq) and ⅜—1 in. (sq)	No. 3 and 5 in principle
40	Crushed limestone clean and free from dust and dirt	¾—1¾ in.	No. 4 in principle
41	Complete specification covering requirements for weight strength, solubility, wear, absorption and cement quality	½—2½ in. (rd)	No. 24 in principle
42	Specific limitations on weight, toughness, soundness, abrasion	1½—2¾ in. (rd)	No. 24 in principle
43	Specific limitations on weight, toughness, soundness, abrasion	1½—2¾ in (rd)	No. 24 in principle
44	Specific limitations on weight, toughness, soundness, abrasion	¾—2½ (rd)	No. 4 in principle
45	None	No. 4—1 in.	No. 57

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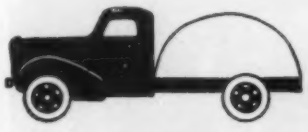

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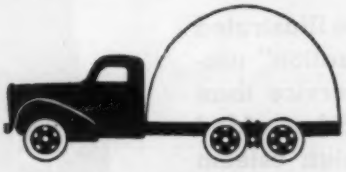

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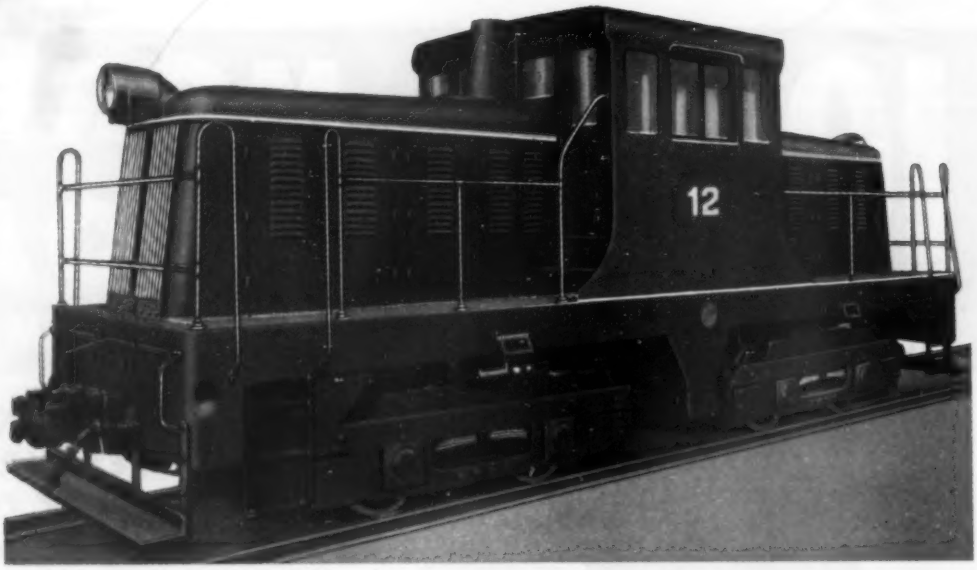

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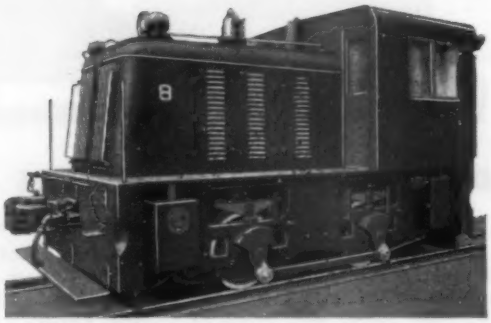
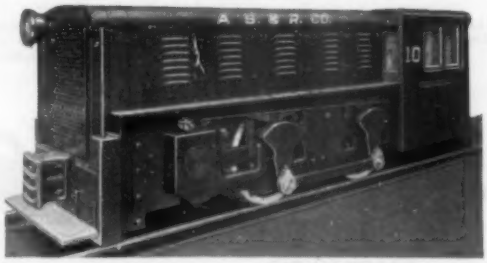
As indicated by the examples here illustrated this policy of "flexible standardization" usually enables us to give better service than would otherwise be possible and has aided materially in establishing the high esteem with which Vulcan Diesel-Electric Locomotives are regarded by many well-known users. Detail promptly on request.



25-ton, 60"-gauge, Diesel-Electric Locomotive for service in the Canal Zone. Equipped with one complete power-plant, one traction motor and counter-balanced side rods.



14-ton, 24"-gauge, Diesel-Electric Locomotive for large smelting company. Equipped with one complete power plant, one traction motor, and counter-balanced side rods. Designed to operate under conditions of limited height and width.

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Electric Locomotives and Larrys	Automatic Quick-Lime Hydrators	Shaking-Chute and Chain Conveyors	Cast-Steel Sheaves and Gears

(Continued from page 56)

heavy in fines was used. A normal volume of ballast will be placed by this railroad through 1944.

Asphalt Treated Ballast

Another Eastern line prefers 1- to 2½-in. crushed stone ballast, which the chief engineer claims has great stability under heavy traffic conditions when tamped with proper equipment. In commenting upon cold asphalt treated ballast, he remarked that it should have wide application in places such as railroad stations where special effort must be made to shed dirt, grease and debris from the ballast.

A midwestern line uses a 1- or 1¼-in. top size gravel with 30 to 35 percent minus the No. 4 sieve to prevent fouling. Apparently the engineer believes the fines will prevent the infiltration of dirt. Some crushed stone and minus ¾-in chats are also used as well as a disintegrated granite at the western end of the line. Practice is to make the specifications to suit materials that meet quality standards.

The foregoing serve to illustrate the differing opinions of engineers representing large railroads. There are many variables, such as traffic loads, train speeds, the character of subgrade conditions, etc., behind these opinions and, of course, each engineer has had experience with certain limited sources of ballast materials economically available for his needs.

EDITOR'S NOTE—The summary of slag ballast requirements appears on page 100.

TABLE 2 — SUMMARY OF SPECIFICATIONS FOR GRAVEL BALLAST

Railroad No.	Requirements: General	Grading	Conforms to or Met in Principle by AREA Grading Number
1	AREA recommendations		
3	Based on AREA recommendations of 1926		G-1 in principle
4	Free from dust, dirt and loam	No. 10—1½ in. with intermediate limitations (sq)—(40% crushed)	G-3 with minor modifications
5	Free from dust, dirt and loam	No. 10—1¼ in. (20% crushed)	G-2 with minor modifications
6	Based on AREA recommendations current in 1926	(40% crushed)	
9	None	No. 16—1⅛ in. with 50% crushed and No. 8—No. 1 with 15% crushed	G-1 in principle
10	None	Gives typical grading varying percentages of crushed particles for different sizes	Within limits of G-3
11	Source specified	½—1½ in. and No. 8—1½ in.	No. 4 or 5 and G-3 in principle
12	AREA recommendations in 1929 Manual		
15	None	⅜—1½ in.	G-3 in principle
17	Similar to AREA pit-run gravel specifications		Pit-run in principle
18	Free from dirt and foreign matter	Pass 1½ in. and contain 18% sand	G-2 in principle
19	None	Typical grading given for crushed boulder ballast	No. 5 or G-3 in principle
20	Based on 1929 AREA Manual		
21	Uses materials from company owned pits, no specifications		
25	Free from dust, dirt and loam	Passing 2½ in. (rd) with 15 to 20% sand	Pit-run in principle
27	AREA in principle		
28	Hard, strong and durable	No. 16—1½ in.	G-2 in principle
29	None	Washed and crushed ⅜ in. to 2 in. with 30% sand	
30	AREA		
32	Hard, strong, and durable	Typical grading given with variable percentages of crushed for different sizes	Falls within limit of G-3
33	None	⅜—2¾ (40% crushed)	None
34	Based on AREA recommendations current in 1934		
36	No specifications; uses pit-run gravel from selected source		
37	AREA recommendations current in 1937		
38	Written about source of supply		Consistent with AREA recommendations
41	Free from dirt, dust and loam	Passing 2½ in. (rd) and containing 15 to 20% sand and a second classification passing 2½ in. (rd) and containing 30 to 40% sand	Pit-run in principle
42	Based on earlier AREA recommendations (20% crushed)		G-3 in principle
43	Based on earlier AREA recommendations (20% crushed)		G-3 in principle
44	AREA recommendations current in 1936		
45	None	Crushed and washed passing 1½ in. and containing 30% sand	G-2 or G-3 in principle

1944 Cement Requirements

IT has been estimated by the W.P.B. that portland cement requirements for 1944 will be 70,788,000 bbls., of which 66,338,000 bbls. will be used for domestic construction, and 4,450,000 bbls. will be exported. Exports include shipments to Alaska, Hawaii, Puerto Rico, Canal Zone, and foreign countries and for military construction outside of continental United States. Some of the cement used outside of United States will be procured in foreign countries.

Total estimated 1944 requirements represent a 44.5 percent decrease from 1943 consumption, with a 45 percent decrease for domestic use and a 35.1 percent decrease for export.

Consumption in 1943, according to Bureau of Mines monthly shipment data, was highest in the area comprising Alabama, Florida, Georgia, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, and Virginia. In this area, consumption was 22,084,000 barrels, or 17.3 percent of total consumption. This year, Arizona, California and Nevada are expected to have the highest combined requirements, with 14,528,000 barrels or 20.5 percent of total requirements.

"It is unlikely," W.P.B. building materials division officials said, "that actual requirements in 1944 will prove to be materially lower than the estimates. Consumption may run higher, depending on possible increases in the use of cement for maintenance and repair, or in the event that the war situation permits a greater volume of new construction than has been estimated."

Silica Plant Fire

MANUFACTURERS' MINERAL CO., Seattle, Wash., has reported that a fire recently destroyed its silica plant at Chewelah, Wash., with a loss of about $30,000. G. H. Waterman, president of the company, said that reconstruction of the plant will start immediately. It is hoped to have the drying and screening units completed by the middle of July. J. H. Ainsworth is manager of the plant. The fire started in the building occupied by the oil-fired dryer.

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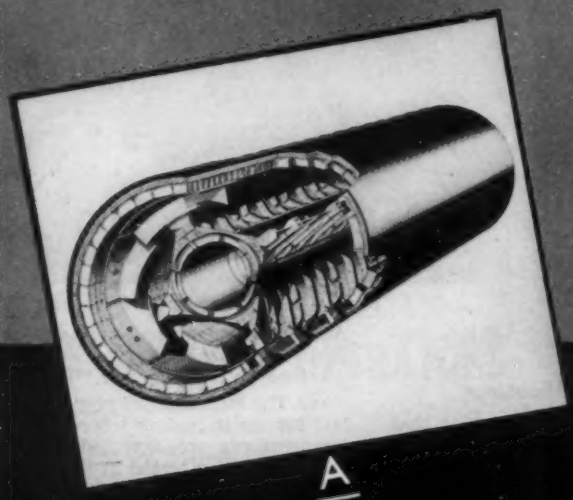
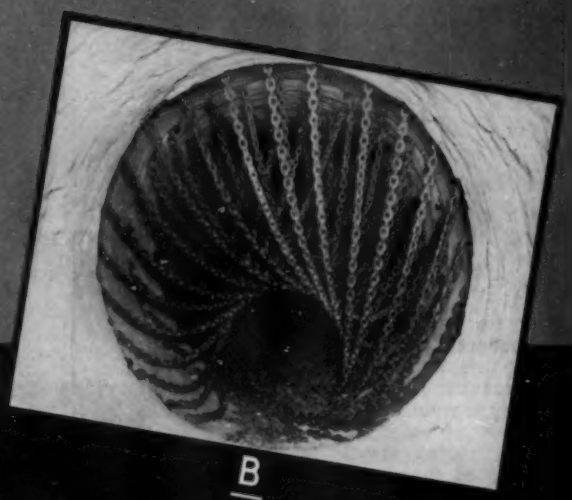


A



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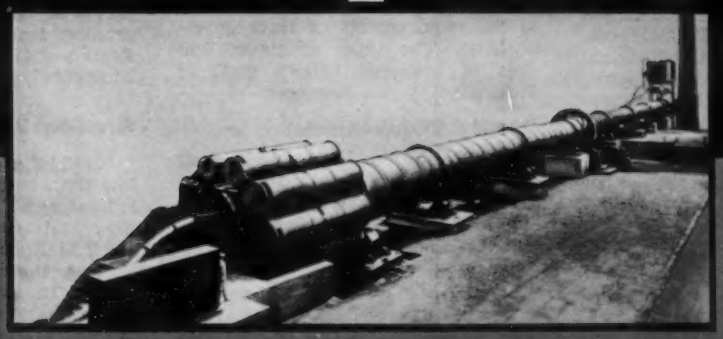

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A.R.E.A. Specifications for Railroad Ballast

American Railway Engineering Association has issued proposed consolidated specifications for prepared ballast covering crushed stone, crushed slag, gravel and other materials

By RALPH S. TORGERSON

Looking down a stretch of well-maintained double-track on the Rock Island railroad

WITH CONSTRUCTION falling off to low levels, ballast is looming up as one of the big markets for producers of gravel, crushed stone, and slag. The railroads have plenty of money for track maintenance, and their budgets indicate that they intend to use it for this purpose if sufficient labor can be found to carry out this program.

The new proposed American Railway Engineering Association ballast specifications therefore should be of prime interest to all rock products producers. Stanton Walker, director of engineering, National Sand and Gravel Association is chairman of the subcommittee which prepared the specifications and A. T. Goldbeck, engineering director of the National Crushed Stone Association, is a member of the subcommittee largely composed of railway maintenance of way officials. Mr. Goldbeck is chairman of another subcommittee, of which Mr. Walker is also a member, which has been given the assignment to Study the Effect of Tamping.

Replies from 46 railroads to questionnaires sent out by the subcommittee indicate that while few of the railroads have incorporated A.R.E.A. recommendations bodily in their requirements, many have modeled their specifications closely after these requirements. However, they have not generally revised their specifications to bring them into line with current recommendations. In the case of stone ballast, most of the railroad specifications give only limiting sizes with no intermediate requirements, but it is believed that most materials meeting these requirements for limiting sizes would fall within the intermediate limitations recommended by A.R.E.A. As for gravel specifications, while there was a great diversity of opinion as to grading requirements, the recommendations are in line with the spirit of A.R.E.A. recommendations.

New Specifications

General requirements provide that prepared ballast shall be crushed stone, crushed air-cooled blast furnace slag, or gravel (crushed or uncrushed, as specified) composed of hard, strong and durable particles, free from injurious amounts of deleterious substances and conforming to the requirements of these specifications. The type, or types, and sizes of prepared ballast shall be designated by the Engineer.

Quality Requirements:

(a) Deleterious substances shall not be present in prepared ballast in excess of the following amounts:
Soft and friable pieces...5 percent
Material finer than No.
200 sieve .....1 percent
Clay lumps .....0.5 percent

(b) The percentage of wear of prepared ballast, tested in the Los Angeles machine, shall not be greater than 40 percent except as otherwise specified by the Engineer.*

(c) The soundness of prepared ballast for use in regions where freezing temperatures are expected shall be such that when tested in the sodium sulfate soundness test, the weighted average loss shall not be in excess of 10 percent after five cycles.

(d) The weight per cubic foot of prepared slag ballast meeting the grading requirements of this specification shall not be less than 70 lbs. compacted.

Grading Requirements:

(a) The grading of prepared ballast shall be determined by test with laboratory sieves having square openings and conforming with current A.S.T.M. Specifications for Sieves for Testing Purposes, Designation E11. (Note: In laboratory tests, a sieve with square opening *D* will permit approximately the same size of material as a screen with round opening 1.2 *D*.)

(b) Crushed stone and crushed air-cooled blast furnace slag for prepared ballast shall conform to the following requirements for grading:

(Continued on page 99)

*Availability of local materials and knowledge of service records may make it economical for the Engineer to permit of higher losses than 40 percent; however, the Engineer is warned against permitting losses in excess of 50 percent without thorough investigation of all factors.

Size No.	Nominal Size Square Opening	Amounts Finer Than Each Sieve (Square Opening Laboratory Sieves), Percents by Weight 3"	2½"	2"	1½"	1"	¾"	½"	⅜"	No.4	No.8
24	2½"–¾"	100	90–100	..	25–60	..	0–10	0–5	..	..	..
3	2"–1"	..	100	90–100	35–70	0–15	..	0–5	..	..	..
4	1½"–¾"	..	..	100	90–100	20–55	0–15	..	0–5	..	..
5	1"–⅜"	..	..	..	100	90–100	40–75	15–35	0–15	0–5	..
57	1"–No. 4	..	..	..	100	90–100	..	25–60	..	0–10	0–5

Note: Size numbers and gradations in size adopted from National Bureau of Standards Simplified Practice Recommendation R-163-39.

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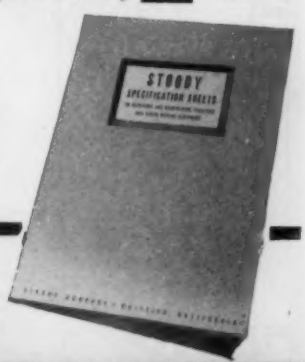

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Chemists' Corner

Graphical Solution of Raw Mix Blending Problems

By C. J. KNICKERBOCKER

ACCURATE PROPORTIONING of unground raw materials is generally accomplished with continuous weighing mechanisms which require frequent setting changes to compensate for the variations occurring in the material analysis. Bulk or volume blending of dry, pulverized raw mix is successfully realized in many cement operations, the materials being proportioned in a manner similar to that for weighed materials. The calculations for either above systems may be made graphically with simple alignment charts, no allowance being required for the moisture-gravity variable present when blending wet mixes.

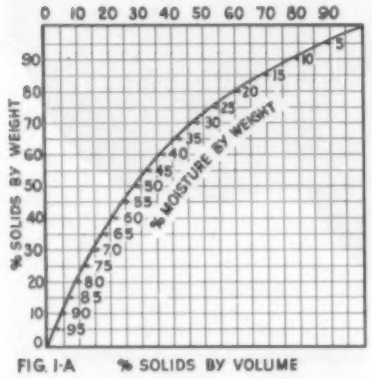

FIG. 1-A

Fig. 1-A: Illustrates the weight-volume relationship of solid materials, assuming a 2.65 dry solids sp.g.

Volume blending of slurries presents the problem of a variable relationship between the solid content by weight and by volume for different moisture contents. Slurries composed of solid materials that do not have widely divergent specific gravities may be proportioned in ratios equivalent to their lime contents provided they have closely corresponding moisture contents. The existence of large moisture differences requires that the absolute volume of solids be known to allow accurate volume proportioning. If the solid component gravities are similar, then the moisture content is the only variable and the lime equivalent of a unit volume of slurry may be computed by substitution in the equation:

$$\%\ \text{CaO} \times \frac{\%\ \text{Solids by weight in the slurry}}{\%\ \text{Solids by wt.} + (\%\ \text{water by wt.} \times \text{sp. g. of solids})}$$

Moisture content is determined and expressed as percentage of the wet material, and CaO as percentage of dry material.

Fig. 1A illustrates the weight-volume relationship of the solid material, assuming a 2.65 dry solids sp. g.

Fig. 1 illustrates a graphical method for the volume proportioning of slurries that have equivalent dry solids gravities and variable moistures. It is apparent that only the range of differences in lime and moisture values experienced in a particular operation need be represented on the chart, thereby increasing the number of graduations possible for a given size drawing and increasing the refinement of the calculations. It is further apparent that moisture contents representing conditions in which the materials cannot be in a state such that the absolute volume of solids is truly represented must be modified to allow for bulking. An example of such would be the addition of crushed clay to a marl slurry. The ultimate graph size should be determined by the minimum spacing of graduations needed.

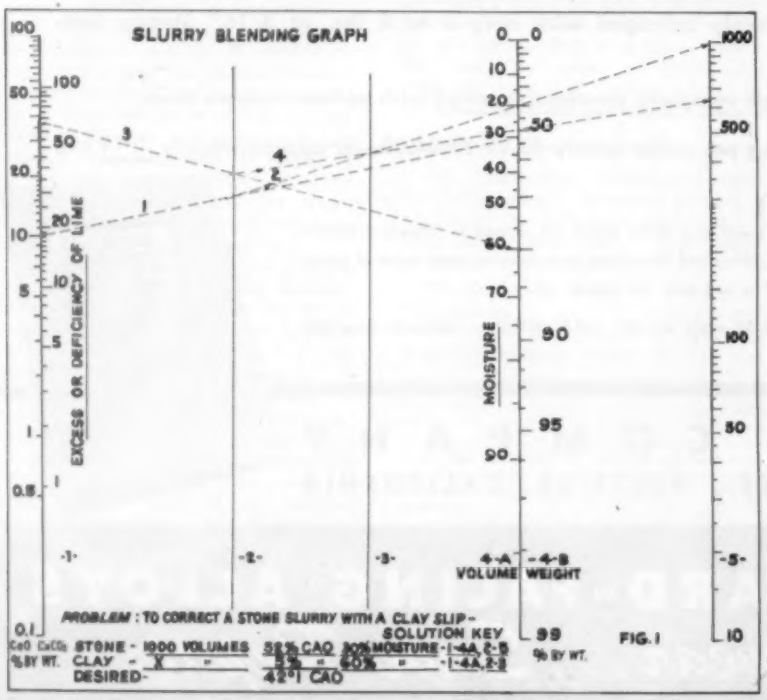
SLURRY BLENDING GRAPH
EXCESS OR DEFICIENCY OF LIME
MOISTURE
VOLUME
WEIGHT
% BY WT.
PROBLEM: TO CORRECT A STONE SLURRY WITH A CLAY SLIP-
SOLUTION KEY
STONE - 1000 VOLUMES 52% CAO 30% MOISTURE - 1-4A, 2-5
CLAY - X " 5% " 60% " - 1-4A, 2-3
DESIRED - 42% CAO
FIG. 1

Fig. 1. Graphical method for volume proportioning of slurries that have equivalent dry solids gravities and variable moistures

Example Solutions

To determine the number of tank inches of clay slip, *moisture 60%, lime 5%*, required to correct a stone slurry, *moisture 30%, lime 52%*, expressed in similar tank inches, to a final volume with *42% lime* content the graph in Fig. 1 is employed.

Given the following conditions:

Stone and clay gravities approximate 2.65.

Stone—0.10 (0.70/2.65 × 0.30 + (0.70) = 0.0468 lime units in excess.

Clay—0.37 (0.40/2.65 × 0.60 + (0.40) = 0.0744 lime units deficient.

0.0468/0.0744 = 0.629 volumes of clay slip for each volume of stone slurry.

Using Fig. 1, connect stone lime excess at *1* with stone moisture at *4-A;* connect the intersection of this line and *2* with 1.000 at *5*, noting the

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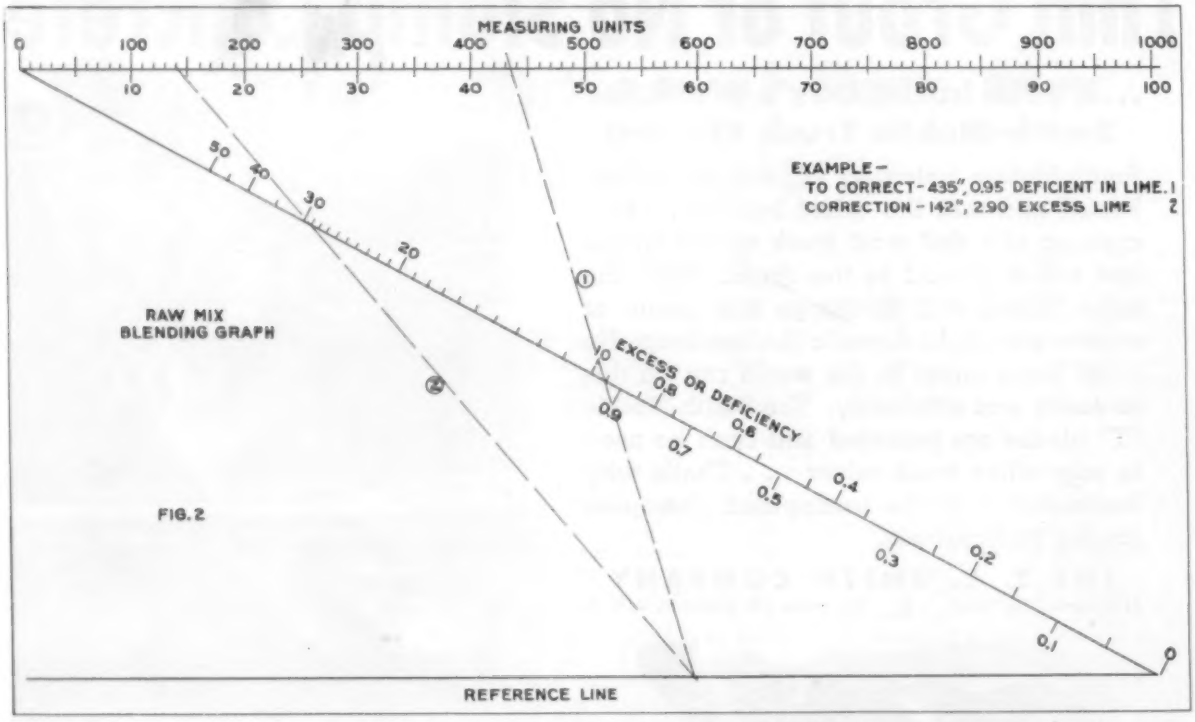

Fig. 2. Raw mix blending graph used to determine adjustment of weight feeder setting

intersection with 3. Connect the clay lime deficiency at *1* with the clay moisture at *4A;* connect the intersection of this line and *2* with the stone intersection at *3* and extend to the required clay value (0.630) at *5*.

It is of interest to note that an increase of 0.10 in the dry clay gravity would result in a final blend of 42.26% lime, using the clay volume found by the graphical solution based on equivalent gravities, this being approximately equivalent to 20 clay volumes in a total blend of 1650. Such a blend being of a preliminary nature, the difference is one that would cause no concern.

To adjust a weight feeder setting that is handling material 2.9% high in lime so that its product will equal-

(Continued on page 72)

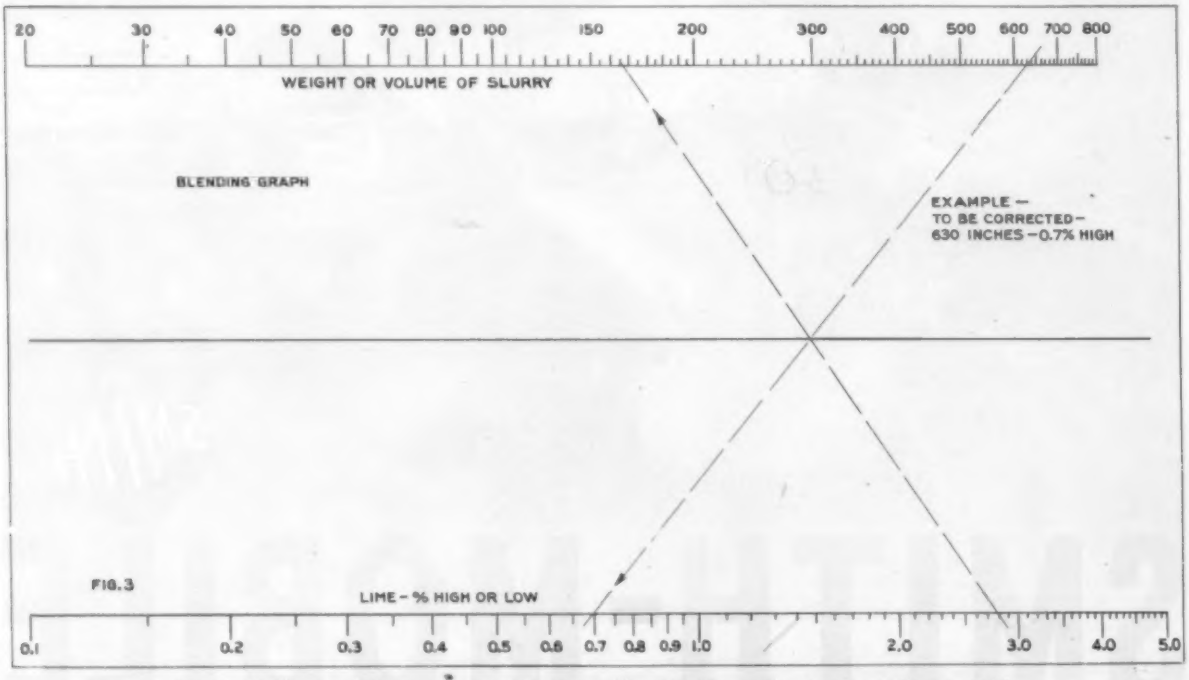

Fig. 3. Blending graph for use in correcting slurry with excess lime. Note example solutions in article

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Fight Trade Commission Cement Order

ATTORNEYS for the Marquette Cement Manufacturing Co., the firm of Zimmerman and Norman, Chicago, have made an interesting statement relative to the filing by the Federal Trade Commission, before the United States Circuit Court of Appeals for the Seventh Circuit, Chicago, of its "Answer in Opposition to Petitioners' Motions to Adduce Additional Evidence" in the cement case which is pending on appeal from the final orders of the commission issued several months ago. The Commission filed its answer in the federal court, seeking to prevent the Marquette Cement Manufacturing Company from presenting evidence to prove charges that the Commission had prejudged the issues under the complaint, which the Commission issued against the cement industry in 1937, and was heretofore disqualified to sit in judgment in the case because of bias and prejudice. The attorneys point out that the Commission now seeks to avoid the consequences of bias and prejudice, that is, disqualification such as ordinarily would be applied to any judge or juror, by suppressing the 23 publications of the Commission which contain the factual evidence upon which the charges of bias and prejudice are based.

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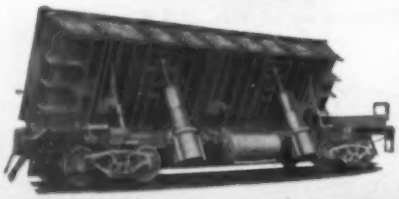

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Steel Officials Inspect Northampton Cement Plant

DIRECTORS of the United States Steel Corporation recently inspected the new Northampton, Penn., plant of the Universal Atlas Cement Co., the newest and most modern of the Universal plants. Universal Atlas Cement Co. is a subsidiary of the steel corporation. Now operating at about half of its peak capacity, the plant is capable of an output of 3,500,000 bbls. of cement annually.

The directors of the steel corporation who made the inspection trip were: Irving S. Olds, chairman of the board, Arthur M. Anderson, Benjamin F. Fairless, president, Leon Fraser, Nathan L. Miller, George A. Sloan, William A. Irvin and Enders M. Voorhees. Universal Atlas officials in the party were: President Blaine S. Smith, George H. Reiter, Henry P. Reid, Louis M. Funderburg, Sidney J. Robison, Richard B. Hynes, Max A. Berns, Frank E. Guy. From the Northampton plant were: Superintendent M. V.Winsch, Alfred F. Tidabock, L. J. Boucher, Lewis G. Sprague and F. E. Womer.

Letter to the Editor

Fertilizer Resources of Our Soils

SIR:

We have been much interested in your publication of Dr. Albrecht's fine article in your May issue on page 58, with your splendid foreword thereto.

More and more authorities come out for the line of thought we have been pursuing since 1897 in the advocacy of the use of finely ground phosphate rock for direct application to the soil on which the pioneer work of Dr. C. G. Hopkins as the early advocate, Frank I. Mann as the largest early user, and John Ruhm, Jr., as the persistent producer, have brought them the appellation of the great triumvirate of the Illinois System of Permanent Agriculture.

It is noteworthy that whereas in 1030 when one of your articles, "Phosphate Rock in 1930 and Two Previous Decades", was published, Illinois farmers used 40,000 tons of ground phosphate rock and only 3,000 tons of commercial fertilizer, Dr. De Turk's figures for 1943 show the use of 114,179 tons of commercial fertilizer and 175,581 tons of ground rock. During that same period several hundred thousand tons of agricultural limestone has grown to around 3,000,000 tons.

What might these tonnages be all over the country had the fertilizer industry not been able to so thoroughly mold the opinion of all other States.

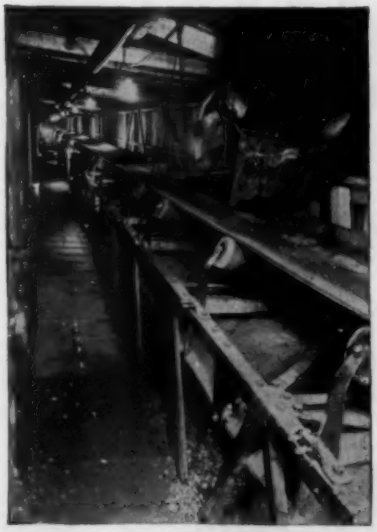
Sincerely yours,

H. D. RUHM, VICE-PRESIDENT
Ruhm Phosphate & Chemical Co.

NEARLY NEW CONCRETE BATCHING PLANT

Capacity 250-350 Cu. Yd. Per Hour . . . Available for Immediate Delivery.

Complete Butler concrete plant. Excellent condition, used only 7 months. Adaptable for either commercial or construction use where high rate of concrete pour may be required. Equipped for manual, semi-automatic or automatic operational control. See details below.



BATCHING BIN. Bin—250 yd. capacity—190 yd. 3-compartment aggregate 400 bbl. cement.

2 BUTLER CEMENT STORAGE BINS. 2,000 bbl. capacity, 2-compartment, 3,000 bbl. capacity, single compartment. All bins equipped with air jets and steam jets.

BATCHERS. 1 Butler aggregate 5 yd. capacity, complete with beam-type scale, manual operation.

1 Butler cement 3,000 lb. capacity, complete with beam-type scale, manual or automatic operation.

1 Butler water batcher 200 gals. capacity, beam-type scale, complete with 400 gal. surge tank and valves, manual or automatic operation.

ELEVATOR & TRACK SCREW. 300 bbl. per hour capacity, screw 37 ft. long, equipped for either box car or hopper car cement delivery. Complete with 20 hp. electric motor.

CONVEYORS. 1 Barber Greene 36" inclined conveyor 224' 6" long, equipped with: 50 hp. Century motor; one 40 yd. track hopper; one 20 yd. track hopper; one 20 yd. truck hopper. All necessary A frames, trusses and supports included. All hoppers equipped with discharge gates.

1 Barber Greene 36" horizontal conveyor 129' 6" long. Complete with 18 double clam-type fill valves, 20 hp. Century electric motor complete with trusses.

1 Barber Greene 36" inclined conveyor 60' 6" long. Complete with 15 hp. electric motor, trusses and supporters.

All conveyors in excellent condition; two-way Alemite system of lubrication; band-type brake; pivoted distributor, ground level controlled. Conveyors operated under cover while in use. Idler take-up and return idler rollers in good shape. Extra length new 500 ft. belt available.

MISCELLANEOUS. Collecting hopper under batcher, 5 feet cement screw feeder complete with motor for automatic control of cement. Traveling hopper for charging batch trucks. Extra cement buckets, drive chain, elevator chain for cement elevator and track screw, etc.

Also 28 Late Model Transit Mixers

11—1942 Model Jaegers — High discharge, separate engine drive with two-speed transmission. 7 mounted on 1942 Dodge six wheelers, good rubber, excellent condition.

7—1942 Model Smiths — High discharge type. These mixers were used only 6 months.

Also 6 — 1938 Model Smiths — High discharge type. 3 mounted on 1938 Autocars, 2 on Macks and 1 on White truck. All single axle drive in good condition, with good rubber.

MOTOR TRUCK SALES AND EQUIPMENT COMPANY

Telephone: CALUMET 1255

2435 COTTAGE GROVE AVENUE **CHICAGO, ILLINOIS**

Sand Recovery

(Continued from page 39)

The original sample, say 1000 grams, had 5 grams of minus No. 100 (0.5 percent). The new sample will have 15 g. The original sample had 5.2 percent, or 52 g. of minus No. 50; the new sample will have 156 g.; thus we have added 10 g. of minus No. 100 and 104—10 or 94 g. of plus No. 100 but minus No. 50. This makes the whole new sample weigh 1104 g., which requires correction of the percentages passing as follows:

No. 100.....	1.4 percent
No. 50.....	14.1 percent
No. 30.....	48.8 percent
No. 16.....	87.0 percent
No. 8.....	97.0 percent
No. 4.....	100 percent

This new product, by the addition only of approximately 10 percent more raw material as fines, makes the product shown on the chart Fig. 3 by the dotted line and circular ⊙ dots, as compared with specification sand, shown, as in Fig. 2, by the dash lines and square dots (colored area).

The comparison shows that the addition of the fines improved the original product, but it did not correct the sag shown on the No. 8 and No. 16 sieve lines. Too large a percentage of the material is in the minus No. 8, plus No. 30 size — around 20-mesh possibly. The left-hand percentage scale shows this weakness as not enough *retained* on the No. 8 and No. 16.

Suppose now we take out one third of the 961 g. of the previous sample (which has the fines added) in the minus No. 16, plus No. 30 range. This will reduce the weight of the whole sample by 320 g., making it 784 g., which will change the percentages as follows (assuming it can be done):

No. 100.....	1.9 percent
No. 50.....	19.9 percent
No. 30.....	68.9 percent
No. 16.....	81.7 percent
No. 8.....	95.7 percent
No. 4.....	100 percent

This new (suppositious) product plotted on chart Fig. 3 in full line with triangular dots shows this will not do the trick. Suppose instead we take out of the 948 g. retained on the No. 50 but through the No. 30 (in the original sample plus fines) one third or 316 g., making our sample now weigh 788 g. Our percentages would be:

No. 100.....	2.0 percent
No. 50.....	19.9 percent
No. 30.....	28.4 percent
No. 16.....	81.9 percent
No. 8.....	96.0 percent
No. 4.....	100 percent

This estimated product, plotted with the full lines and full black dots in Fig. 3 shows that we change the gradation for the better, but we can't change the need for the coarser sand sizes, unless we are prepared to waste a large part of the raw material—say half. Suppose, for example, we start back with the original material to which only the 104 g. of fines were added, and take out now both the 320 g. of minus No. 16, plus No. 30 and 316 g. of minus No. 30, plus No. 50—both of the previous extractions combined.

Our sample (theoretically) is now 468 g. with the following analysis:

Passing No. 100.....	3.0 percent
No. 50.....	33.5 percent
No. 30.....	48.0 percent
No. 16.....	67.5 percent
No. 8.....	92.5 percent
No. 4.....	100 percent

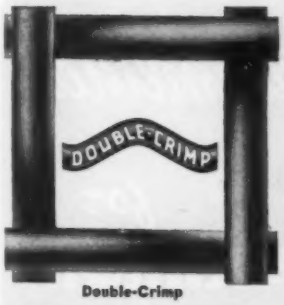
We won't bother to plot this. A glance shows its content passing No. 50 is now too high, and we would have to discard some of the minus No. 50, plus No. 100, which we previously added. The percentage retained on the No. 8 is still too low, even though we have discarded more than half the original undersize material.

Conclusions

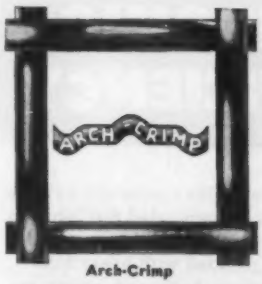
The charts clearly have shown the infinite variety of experimenting that can be done on paper to improve the gradation of sand of given sieve analysis. Moreover, as in this instance, a purely extraction process will not

(Continued on page 72)

Don't Overlook These
LOW MAINTENANCE FEATURES
In choosing a new vibrating screen for your plant, don't overlook these features in design and construction which are built into Plat-O Vibrating Screens to assure you of dependable performance and rock-bottom maintenance costs:
(1) Heavy steel framework and sides are of all-welded construction; bearings, drive shaft—even bolts—are oversize. (2) Only two (oversize) bearings are used and neither supports the screen's weight. (3) Oil lubrication (no grease) penetrates to every moving part and surface, permitting operation at higher speeds with less heat. (4) Automatic screen cloth tension prevents whipping and reduces wear; provision for changing screen cloth on each deck, independently of the others, cuts down time for changes.
We've outlined here only a few of Plat-O's money-saving—and money-making—characteristics. You can get all the details by writing for Bulletin 27-A.
DEISTER MACHINE COMPANY
FORT WAYNE 4, INDIANA
PLAT-O
by DEISTER

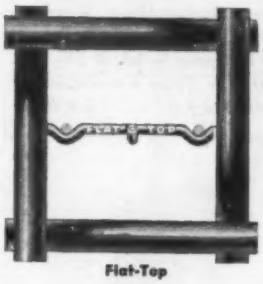


Double-Crimp



Arch-Crimp

Intermediate-Crimp



Flat-Top

"The Perfect"

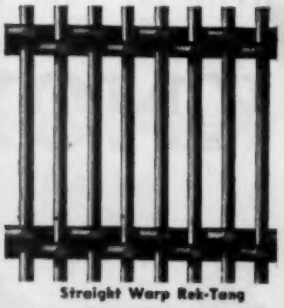
Wire Cloths and Screens

OF

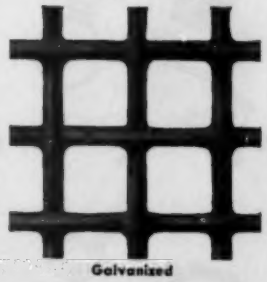
SUPER-LOY STEEL

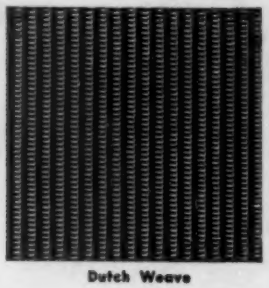
GALVANIZED STEEL
STAINLESS STEEL
NICKEL-CHROME STEEL
PHOSPHOR BRONZE
BRASS
COPPER
MONEL
NICKEL
ALUMINUM

ANY SPECIAL METAL FOR ANY SERVICE


Straight Warp Rek-Tang

Calendered Rek-Tang


Galvanized


Dutch Weave

"Perfect" WEAVES

ARCH-CRIMP
Coiled
DOUBLE-CRIMP
DOUBLE-FILL
DUTCH
FLAT-TOP
INTERMEDIATE-CRIMP
REK-TANG
Selvage-Edge
STRAIGHT-WARP
Stranded
STA-TRU
Triple-Warp
Twilled
Twisted-Fill
Twisted-Warp

"Perfect" PROCESSING

Arc-Welding
Bending
Binding
Brazing
CALENDERING
Coiling
Crimping
Cutting
Dipping
Dishing
Finishing
Flanging
Flattening
Forming
Framing
GALVANIZING
Jointing
Knuckling
Painting
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Shaping
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Soldering
Spot-Welding
Squaring
Stitching
Tack Welding
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Baskets
Circles
Coils
Cones
Cylinders
Discs
Forms
Leaves
Lengths
Panels
Pieces
Ribbons
Rings
Rolls
Sections
Segments
Strips
Templates

Illustrations show items listed in capital letters. Other wire cloths and screens will be illustrated in subsequent advertisements of this series.

Sta-Tru

THE LUDLOW-SAYLOR WIRE CO.

ST. LOUIS 10, MISSOURI

Write for your copy of the CATALOG

KNOX
Valves-Couplings-Nipples-Clamps-Menders

KNOX MANUFACTURING CO.
818 Cherry St. Phila. 7, Pa., U.S.A.
SINCE 1911 PRODUCERS OF
KNOX
Valves-Couplings-Nipples-Clamps-Menders

Sand Recovery

(Continued from page 70)

always suffice, even with the addition of fines. The example given is probably an unusual one in that the lack of coarse sand was due to a hasty initial separation, by gravity screens, which carried over into the gravel enough coarse sand to correct the gradation, when recovered, and when appreciable amounts of the material around 30-mesh were also wasted. The necessary No. 50 and No. 100 fines were recovered by more careful use of hydraulic sand-settling devices.

There probably is no better way to get acquainted with your raw material and your finished product than to plot the screen analyses from time to time. It would seem almost impossible to have much definite information as to what your screens and classifiers are actually doing, unless you have such records to refer to. So, we trust the reader will pardon our emphasis on charts. The next step is to take the humps and sags out of the sand grading which the charts make obvious in some kind of device designed for that purpose, or adaptable to it. We'll begin by telling how this was done in the operation referred to here.

Raw Mix Blending

(Continued from page 66)

ize an identical feeder product set at 435 lbs. and handling material 0.95% low in lime Fig. 2 is used.

$435 \times 0.95/2.9 = 142.5$ lbs. setting.

Using Fig. 2, align 435 with 0.95 on the diagonal and extend to intersect the reference line; align this point with 2.9 on the diagonal and the extension intercept on the base line is the desired value (142).

Slurry with Lime Excess

To correct 630 in. of slurry with a lime excess of 0.7%, with a slurry that is deficient 2.8%, Fig. 3 is used. Moisture differences small.

$630 \times 0.70/2.8 = 157.5$ in.

Using Fig. 3, align 630 with 0.7; align intersection of this line and center line with 2.8; this line extended cuts the measuring unit line at 157 in.

Operators in the laboratory find extensive use for graphical solutions. Mill foremen, mill operators and blending tank operators also will use these graphs if given access to them and instructed in their use. With certain classes of help they offer an improved means of conducting simple calculations. (The graph and problem solution for correcting a low-lime slurry will be printed in a coming issue of ROCK PRODUCTS.)

•

BIRMINGHAM SLAG CO., Birmingham, Ala., has started to build a very modern concrete block plant at Alabama City, Ala., with W. J. Shaw in charge.

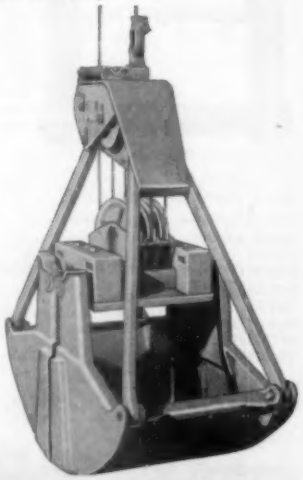
Streamlined for MAXIMUM DIGGING EFFICIENCY

Field tests on a wide variety of jobs have conclusively demonstrated that Johnson All-Welded Buckets dig faster... bring up a bigger payload with every bite.

Power wasting bolts and rivets are eliminated. The shape of the shell provides fast and easy filling with a minimum of lifting action. Lip edge bar of abrasive resisting manganese steel has many times the effective life of the ordinary steel lip. It's easily renewable right in the field, too!

Many other new and exclusive Johnson features in the design and construction of arm bracket, center hinge and sheave blocks step up efficiency . . . reduce time out for maintenance and repairs.

Three types: Rehandling, ½ yd. to 2½ yds.; General Purpose, ½ yd. to 2 yds.; Heavy Digging, ½ yd. to 1½ yds. *General Purpose Type available for immediate delivery.*



The C. S. Johnson Company
Champaign, Illinois

Army-Navy Awards

Caterpillar Tractor Co., Peoria, Ill., and employees have been presented the "S" Award for Safety by the National Safety Council.

Bemis Bro. Bag Co., East Pepperell, Mass., has been awarded the Army-Navy "E" pennant in recognition of exceptional service to the Army in furnishing special types of bags needed by our combat troops.

Caterpillar Tractor Co., Peoria, Ill., has for the second time been granted the Army-Navy Production Award for continued and determined effort in the production of war equipment. This renewal adds a White Star to their Army-Navy "E" flag.

The Falk Corp., Milwaukee, Wis., has been granted a fourth renewal of the Navy "E" Award.

The Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc., Passaic, N. J., has had a White Star added to its Army-Navy "E" award for continued meritorious service on the production front.

Iowa Mfg. Co., Cedar Rapids, Iowa, manufacturers of crushers, rock and gravel plants, material handling equipment, etc., has been awarded the Army-Navy "E" pennant for excellence in the production of war equipment. Army-Navy "E" pins were presented to the employees.

Kaiser Co., Inc., Iron and Steel Division, Los Angeles, Calif., has been awarded the United States Maritime Commission "M" pennant for outstanding production achievement.

Union Wire Rope Corp., Kansas City, Mo., has been granted the fourth renewal of the Navy "E" Award for excellence in war production. This time the renewal is for one year instead of six months and entitles them to fly a flag with four White Stars.

Davey Compressor Co., Kent, Ohio, has been awarded an "E" pennant with one White Star in recognition of continued outstanding war materials production.

Aurora Pump Co., Aurora, Ill., has won the nation's highest industrial tribute, the Army-Navy "E" Award for high achievement in the production of war equipment.

Manufacturers' News

The Acme Equipment Co., Detroit, Mich., has been appointed direct factory representatives of the Osgood Company and the General Excavator Co., both of Marion, Ohio.

American Brake Shoe Co., New York, announces that W. J. Mohr has joined the company's Export Division as a foreign representative. Mr. Mohr was formerly with Lincoln Electric Co. and ARMCO International Co. The appointment of Robert H. Ramage as advertising manager, with headquarters in New York, was also announced by the company.

Diamond Iron Works, Inc., Minneapolis, Minn., manufacturers of crushers, screens, conveyors, heat treating furnaces, burners, blowers, fans, etc., has appointed Fred H. Jusenius as export manager. For the past five years Mr. Jusenius has been export supervisor for LeTourneau.

The Jaeger-Lembo Machine Corp., Corona, N. Y., announces that Harold T. Moss, who has been associated with Joseph C. Lembo, president, for more than fifteen years, has been named vice-president and general manager. Announcement is also made of the acquisition of Clarence W. Dennison to the sales force.

National Powder Co., Eldred, Penn., announces that Gene H. Edwards of Latrobe, Penn., has joined the company as a special representative of the sales department. He will devote his time to the anthracite and bituminous coal industry as well as quarries and general contractors.

Manganese Steel and "Counterflow" Design: *an Unsurpassed Combination for Dredge Pumps*

The entrance of manganese steel into the dredge pump picture many years ago set a new standard of service life for pump water-ends through the impact and abrasion resistance afforded by the "toughest steel known." Previously the useful life of the wearing parts had been of a limited duration.

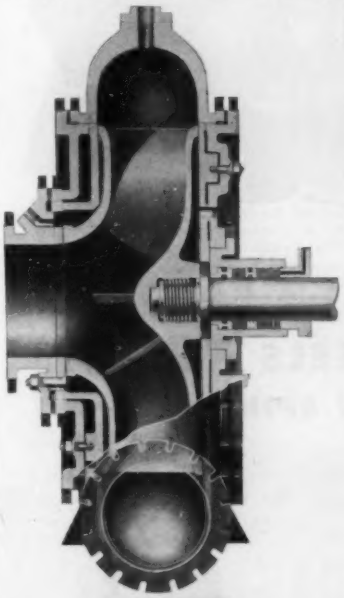
The Amsco "Counterflow" pump, which has been meeting the most severe requirements for nearly a decade, marked another long step forward in dredge pump design.

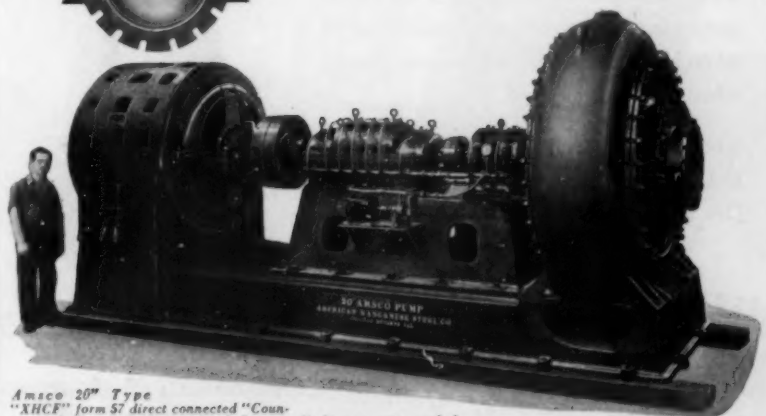
The "Counterflow" design, pictured below, circulates clear water under pressure between the impeller shrouds and the side plate liners. Abrasive wear is greatly reduced by thus replacing grit-laden water which is a cutting agent with clear water which is a lubricant. The wide funnel-mouthed impeller minimizes end thrust and internal leakage. Another important point of this Amsco design is the method of securely attaching the impeller to the shaft, either with threads or tapered bore and lock nut.

All Amsco dredge pump water ends are made of austenitic manganese steel which, beyond comparison, resists continuous abrasion from sand and gravel as well as impacts from boulders.

More Amsco dredge pumps are used for commercial sand and gravel production than any other make, and many are employed in river and harbor dredging.

Ask for bulletin describing Amsco Dredge Pumps, Pipeline Fittings and Rotary Cutters.





Amsco 20" Type "XHCF" form 57 direct connected "Counterflow" Pump with right-hand bottom discharge, water-cooled marine type thrust bearings and force-feed lubrication. Used in construction of dike embankment, Quabbin Reservoir, Commonwealth of Massachusetts.

Amsco
AMERICAN MANGANESE STEEL DIVISION
Chicago Heights, Illinois
FOUNDRIES AT CHICAGO HEIGHTS, ILL.; NEW CASTLE, DEL.; DENVER, COLO.; OAKLAND, CALIF.; LOS ANGELES, CALIF.; ST. LOUIS, MO.
OFFICES IN PRINCIPAL CITIES

AMERICAN Brake Shoe COMPANY

Calcination Control for Lime

(Continued from page 54)

mediate plasticity, superior workability and a covering power probably unequalled by any other lime today.

In the case of dolomitic lime, if the herein described temperature control system is utilized in the fullest possible practical measure, the lime will not need to be hydrated by the expensive and complicated pressure process, because it will have all the desired working qualities with the undesirable expansion characteristics reduced to a negligible point.

Our studies and experiments revealed that the magnesium carbonate of dolomite has two dissociation temperatures, one when heated slowly, and the other when heated fast. This is shown by Fig. 3-A, where it will be noted that the difference between the two is about 400 deg. F., which represents the terrific CO_2 tension necessary to force this gas past the remaining, and obstructing, but still fully formed carbonate cells. While laboratory experiments always gave the higher figure, by a special and novel arrangement of instruments shown diagrammatically by Fig. 3-B, experiments were made encompassing simultaneously the governing factors of temperature, time, weight loss, and CO_2 density, definitely establishing the lower dissociation temperature for the lower heating rate.

This lower heating rate prevails in vertical kilns, and so when burning dolomite these kilns should have two distinct calcining zones, of which one is at the very low temperature of only about 1000 deg. F. A search was made for this zone by the use of several methods and techniques; plain observations at different levels, draw samples, measurements and tests of gases from different levels, and finally the very difficult method of embedding thermocouples within stone, sending them down the kiln, and recording temperature rise over the days that followed.

A zone was found within which the gases are at a relatively mild and virtually constant temperature, an ideal point source for obtaining recirculating gas, hot and high in CO_2. Fig. 1-A shows the temperature gradient of stone and gas superimposed upon the kiln outline. The 7-ft. high magnesia zone is plainly noticeable where stone remains at almost a constant temperature of 1000 deg. F., for a long period of time.

Calcining Zone Recirculation

The "Eldred" and similar processes use gases from the end of stone preheating zone, which are relatively cool, rather than in the Azbe process from the end of the calcining zone, where they are very hot. The first or "Eldred Process" constitutes *cooling*, while the "Azbe Process" relies on *mixing*, an entirely different process. Fig. 4 contrasts the two systems both for dolomitic lime and high calcium lime.

On this system there is no heat loss, while in the case of the "Eldred" and other similar systems, there is a great deal since the gases are reinjected far below the temperature of any section of the hot zone and leave it later at its temperature, carrying heat to waste.

Fig. 4 shows the circuit and temperatures prevailing within same. The gas withdrawn is at 1000 deg. F., and as such is returned to the kiln hot zone, reducing its hot zone temperature from a possible 2500 deg. F. to 2000 deg. F., or even less, 1800 deg. F. if so desired, and all depending upon the amount of gas recirculated.

Heretofore dolomite kilns could not operate efficiently and could not be built large and of high capacity because any steps that tended to raise either capacity or efficiency tended also to raise hot zone temperature and while more lime was made at a lower cost, the product was unsatisfactory and not saleable. This new system now opens the gates to any-

TO MAKE WHEELS *PULL*
INSTEAD of SPIN

Installs easily in place of conventional differential . . . stops spinning of one wheel which normally stalls a vehicle in deep sand, soft fields, mud, muck, snow or on ice, because *both* wheels *must* rotate when power is applied.

Keep truck wheels moving . . . save on gas, oil, tires, chains, time and manpower. Get the facts, *today*. **Send Coupon.**

Install

THORNTON
Automatic Locking
DIFFERENTIALS

TEAR OUT AND MAIL

THORNTON TANDEM CO.
8769-C Grinnell Ave.
Detroit 13, Mich., U.S.A.
Please send me data on your *Automatic-Locking* Differential.

Name .....
Address ..... State .....
City ..... Year .....
Make and Model .....

THORNTON TANDEM CO.
8769-C GRINNELL AVENUE • Plaza 9700
DETROIT 13, MICHIGAN

Make Big Trucks Out of Little Ones with the THORNTON *Four-Rear-Wheel* DRIVE

In U.S.: Sold by TRUCKSTELL DISTRIBUTORS
In Canada: H.V. WELLES, LTD., Windsor, Ont.

thing; lime coolers can be used and air preheated; kilns can be large and of any capacity; induced draft can be employed; combustion can be precise with no excess air and no incomplete combustion, because if temperature rises recirculation can be increased at will, since high temperature is translated over into equally beneficial high volume.

Recirculation to be thermally efficient must be from the end of the dissociation zone where temperatures are too low, to the head of this zone, where they are too high, and this, in such a manner that a minimum of heat is lost in transferring the high heat tempering gases from one point to the other. If this dictum is adhered to, then a maximum quantity of gas can be used for recirculation and the effect is practically that of mixing, not cooling, the overly hot gases being mixed with the cooler ones of the same section, causing temperatures to equalize. In other words, since gases leave the calcining for the preheating section of a dolomitic kiln at a temperature of 1000 deg. F., no cooling agent must be injected into the calcining section that is not at this 1000 deg. F. This also applies to the high calcium kiln except that there the limiting temperature is 1350 deg. F.

Under this method of operation the producer would be putting out an increased volume of lower temperature gas which would further increase the mass velocity in the kiln, leading to equalized temperatures and higher heat transfer and resulting in lime softly burned, low in core and residual CO_2, a much better lime of greater availability and reactivity.

With temperatures lowered and equalized by this process, this kiln charge may now be slipped when drawing, rather than hung to trim, which latter greatly complicates operations. Continuous and automatic draw can then be readily utilized, or the semi-automatic type, in which the lime would be drawn say, every half-hour, rather than every four hours, which now ordinarily is the case. The frequent rearrangement of the charge, exposure of new surfaces, more frequent removal from the hot zone, all this would further enhance the quality of the lime.

(To be continued)

Need More Asbestos

ONLY one percent of the nation's requirements for asbestos was supplied by United States producers during 1943, according to Bureau of Mines statistics. Ordinarily the United States produces only 4 to 6 percent of its asbestos needs, but the demands of the present war emergency has reduced this small proportion. Domestic production consists normally of the shorter grades of chrysotile. Canada supplied the larger of the chrysotile requirements of the United States, but Canadian output is chiefly of the non-spinning shorter grades and importation from Africa, Soviet Russia, Australia, and India had to be made to supplement this nearby source of supply.

Arizona, important source of chrysotile asbestos in this country, reported the following producers: Arizona Chrysotile Asbestos Co., Arthur Enders, and Guy G. Phillips, all of Globe, Ariz.; Earl Pierce of Young; and Johns-Manville Products Corporation, at Chrysotile, Ariz. A new company, Pine Top Asbestos Mines, north of Globe, is opening a mill. California's only producer is Kohler & Chase, Monticello, Calif. Georgia is represented by the Powhatan Mining Co., near Dillard. North Carolina has the largest producer of amphibole asbestos in the United States, the Industrial Minerals Corporation, at Newdale, which produces a material for welding rod coating. W. T. Hippey at Micaville produces anthophylite asbestos. Oregon has two producers, Philip S. Hoyt and Mrs. Flora Winsenberg, both producing tremolite asbestos near Grants Pass. The Vermont Asbestos Mines Division of the Ruberoid Co., has discontinued operation of its open-pit mine near Eden, Vt., but has opened up a new source of supply on the opposite slope of Belvidere Mountain.

Climax ENGINES PROVIDE

New **OPPORTUNITIES**

New opportunities for improved performance, increased production and greater flexibility have been found by users of Climax engines.

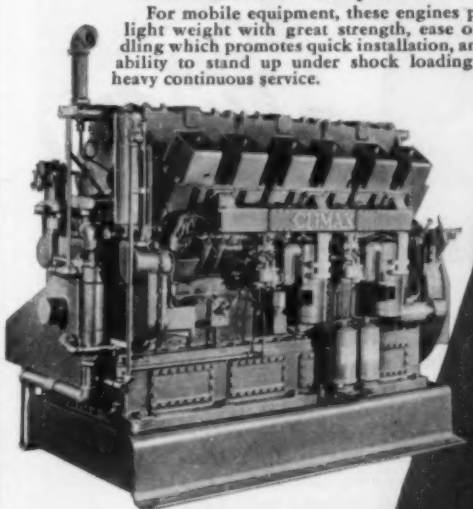
Where required, the engine may be job-rated and equipped for the work to be done. Economies result from the high efficiencies, heat recoveries and trouble-free operation.

For mobile equipment, these engines possess light weight with great strength, ease of handling which promotes quick installation, and the ability to stand up under shock loading and heavy continuous service.

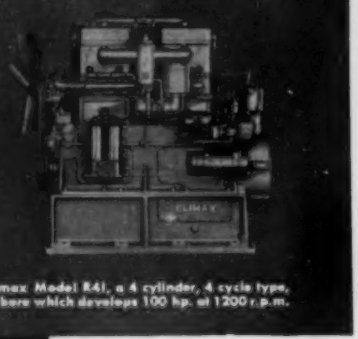
For Pump, Compressor and Mill Equipment Manufacturers—requiring efficient slow speed drives 22 to 495 hp.

For Shovel, Dragline, Snowplow and other Mobile Equipment Manufacturers—who need compactly designed, easily installed, rugged engines up to 495 hp.

For Power Plant Engineers—to obtain quick-starting standby power 300 watt to 312 KVA. Climax engines directly connected to generators protect valuable equipment, prevent overloading.



The Climax New V495, a 12 cylinder, 60° V, 4 cycle type, 7" x 7" bore, which develops 495 hp. at 1200 r.p.m.



The Climax Model R4I, a 4 cylinder, 4 cycle type, 6" x 7" bore which develops 100 hp. at 1200 r.p.m.

"For High Achievement in the Production of War Material"

Climax

Engineering Company

GENERAL OFFICES & FACTORY: CLINTON, IOWA

REGIONAL OFFICES: CHICAGO, ILLINOIS; DALLAS, TEXAS

Affiliated Companies: McAleer Mfg. Co., Chicago; Roslon-Waters Co., Tulsa

SEND FOR

Climax engine bulletins which give full information. Write to Climax Engineering Company, 1810 South Fourth Street, Clinton, Iowa.

Conveyor Operation

(Continued from page 52)

ordinarily lasts 10 years, the 36-in. belt would have to attain that age and more before any savings in additional wear would begin to show. In that length of time many accidents and unforeseen possibilities may happen. However, if the conditions of loading are such that severe abrasion occurs the wider and slower belt would probably be the more economical.

Having tentatively decided upon a single lagged head pulley for driving the 30-in. belt which would be 6 plies, we should investigate the economy of a tandem drive which would save one ply and also the possibility of saving a ply through snubbing the head pulley. Calculations show that it would be possible to save one ply by snubbing the head pulley to obtain 260 deg. of wrap. This wrap is greater than we would consider to be good practice. If one ply could have been saved by snubbing to say 220 deg., it would be desirable to do so. In the case under consideration, the cost of two additional tandem pulleys and the gears connecting them will be slightly more than the cost of the additional ply. It might seem, therefore, that the tandem drive would be the logical drive since the additional cost would be made up when the second belt is purchased. Here again, we must consider the expected life of the belt and the conditions under which it operates. It has been our experience that in a good many cases where wet material is conveyed, tandem pulleys have been the cause of punctures in the top cover through stones clinging to the belt, and as a result ultimate failure through carcass deterioration. There are many cases where tandem pulleys are essential, but in this case it is estimated that the lagged single pulley with slight snubbing would permit the 6-ply belt to operate at 90 percent of its rated tension with freedom from cover puncturing at the drive and would be preferred.

25 Yards at a Time . . .

● That's the way the Northern Illinois Coal Corporation—one of the nation's larger coal strippers—removes overburden from its fields near Wilmington, Illinois. Having achieved outstanding results with Page Automatic Dragline buckets, this Midwest firm has now standardized on Automatics and has in use 5, 8, 12, 14 and two 25 cubic yard Page buckets, one of which is shown above.

These giant Automatic buckets proved more than a match for extra-tough overburden sometimes in excess of 80 feet deep, and produced yardage 'way beyond what was thought to be dragline possibilities with greatly reduced maintenance and operating costs.

PAGE

Automatic **DRAGLINE BUCKETS**

PAGE ENGINEERING COMPANY, CHICAGO 38, ILL.

Increase in Mineral Wool

PRODUCTION of mineral wool in 1943 reached 551,524 short tons valued at $43,670,710, an increase of $10,863,802 in value and approximately 33,000 tons over the 1942 total as reported to the Bureau of Mines. Sales of home insulation increased and industrial insulation decreased from 1942 totals. Increase in home insulation may be attributed largely to the Government sponsored program for insulating homes to conserve fuel. The decrease in industrial insulation is probably due to the wartime conservation of materials for construction or expansion of industrial plants.

The new commercial specifications for the use of mineral wool blankets, blocks, pipe covering, and insulating cement for heated surfaces, Commercial Standard CS 117-44 for high temperature installations, became effective May 25, 1944. These specifications were proposed by the National Bureau of Standards and the Industrial Mineral Wool Institute.

Mineral wool production in 1943 came from 40 companies operating 53 plants in 19 states compared with 41 companies operating 52 plants in 18 states in 1942. These plants utilized 12 types of raw material, which include slag, 47 companies; limestone 23; woolrock 13; shale 10; clay 8; silica rock 6; glass batch 5; gravel 2; and iron ore, wool rock slag, granite and sandstone, one each.

Talc-Soapstone Products in Demand

INCREASES in the demands from the paint, rubber, paper, insecticide, and foundry facings industries, for talc, pyrophyllite, and ground soapstone, brought both the mined production and sales to levels higher than those of 1942, states a recent Bureau of Mines report. Sales gained six percent and the value of sales increased eight percent. Total tonnage mined in 1943 amounted to 436,249 short tons. Producers sold 412,868 tons in crude, sawed, and ground form during 1943. The total value was $5,121,414.

Sand-Lime Brick Production and Shipments

FOUR active sand-lime block and brick plants reported for May and four for April, statistics for which were published in June, 1944.

AVERAGE PRICE FOR MAY

	Plant Price	Delivered Price
Detroit, Mich.	....	$17.00
Saginaw, Mich.	$15.00	....
Grand Rapids, Mich.	....	15.00
Seattle, Wash.	19.50	21.50

STATISTICS FOR APRIL AND MAY

	*April	†May
Production	710,900	751,812
Shipments (rail)	25,000	175,000
Shipments (truck)	654,900	554,812
Stocks on hand	865,000	890,000
Unfilled orders	1,175,000	3,085,000

Four plants reporting: incomplete, one not reporting stocks on hand and two not reporting unfilled orders.

†Four plants reporting: incomplete, one not reporting stocks on hand and one not reporting unfilled orders.

Correction

ON PAGE 54 of the June issue of ROCK PRODUCTS there appeared an item, under the heading "Approve Gypsum Boards," which requires correction. The conditions of approval listed by the Industrial Commission of Wisconsin should read as follows under section 2: "Approval is given for spans of 16 and 24 in. Greater spans than 24 in. cannot be used. The thickness of material for the 16 in. span cannot be less than 1 in., and the thickness for the 24 in. span not less than 1½ in."

Concrete Slab Contract

J. H. COLLINS & Co., and Charles A. Power, Walla Walla, Wash., have been notified a contract has been awarded to these concerns for 200 apron slabs for igloo magazines at an ordnance depot in Oregon. The amount of the War Department contract is $79,000.

Lubrication Plan

SUN OIL COMPANY, Philadelphia, Penn., has prepared for distribution a complete kit of lubrication manuals, wall charts, technical booklets, etc. This kit of informative material on methods of saving equipment by proper lubrication has been prepared in its program entitled, "Save and Serve."

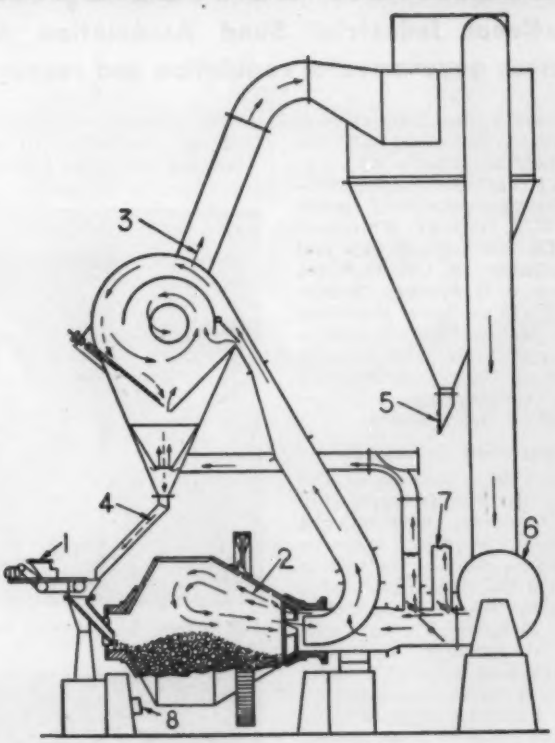
Construction Increase

PRELIMINARY estimates of construction for May, issued June 7, are $295,000,000, about a 3.5 percent increase over the volume of slightly less than $285,000,000 done in April. The War Production Board announced that this is the first time in 21 months or since August, 1942, that the volume of construction in the United States has shown an increase over the previous month. Publicly financed construction accounted for approximately 61 percent and privately financed, about 39 percent.

The downward trend was halted by increases in two categories, military and non-residential construction. Volume of military activity increased about 17 percent, from $46,000,000 in April to an estimated $54,000,000 in May. Non-military, non-residential construction increased about 12 percent, from a figure of $110,000,000 in April to an estimated $123,000,000 in May. Housing dropped about 5 percent below the $61,000,000 volume for April, and factory construction declined about 7 percent. W.P.B. stated in its report that construction will rise somewhat further in the next few months and then probably show a seasonal decline, but the downward trend has been halted.

F. W. DODGE CORPORATION reports that construction contracts awarded during May were valued at $144,202,000 in the 37 eastern states. This constituted a drop of 20 percent from the April total of $179,280,000 and was 39 percent below May, 1943. Private ownership work was valued at $46,244,000 in May and represented 32 percent of the month's total as compared with the 26 percent ratio shown in the preceding month and 18 percent in May last year. On the basis of dollars, the May volume of construction for private ownership was practically at the April level and 9 percent greater than the May, 1943, total.

FINE GRINDING WITH CONICAL MILL AND AIR CLASSIFIER



(1) Material fed to mill by Constant Weight Feeder.
(2) Finished material removed from mill as soon as produced.
(3) Separations as fine as 99.9% minus 325 mesh.
(4) Oversize returned to feed end of mill.
(5) Product discharged at any elevation—no elevator required.
(6) Fan returns clean air to mill.
(7) Small amount of air and vapor vented.
(8) "Electric Ear" Sound Control unit maintains maximum capacity.

HARDINGE

COMPANY INCORPORATED, YORK, PENNA.

NEW YORK CHICAGO SAN FRANCISCO TORONTO

Louis Dill chatting with A. Y. Gregory, to the right, recently elected vice-president of the National Industrial Sand Association

T. C. Matthews of the Pennsylvania Glass Sand Corp., elected president, National Industrial Sand Association

Convention at Hot Springs

National Industrial Sand Association discusses governmental regulation and research

AT THE NINTH annual convention of the National Industrial Sand Association, held at Hot Springs, Va., June 8 and 9, T. C. MATTHEWS, Pennsylvania Glass Sand Co., was elected president; A. Y. GREGORY, Whitehead Brothers Co., vice-president; and GEORGE A. THORNTON, Ottawa Silica Co., treasurer. J. M. STROUSS, Deckers Creek Sand Co., retiring president, presided at the meetings, which were concerned exclusively with matters of business of the association and reports on governmental activities vitally affecting this industry.

Compensation Insurance

The only outside speaker at the meeting was THEODORE C. WATERS, the Association's counsel, who brought the members up to date on compensation insurance codes in the various states. Among the most important is a new code in New Jersey, effective January 1, 1945, which covers silicosis, and will probably stop considerable racketeering, possible under the old laws. It covers total disability only. While insurance rates to cover this risk have not been promulgated, they should be reasonable.

The Kentucky legislature passed a silicosis act effective May 30, 1944. The State of Virginia has a new act which becomes effective July 1, 1944, that includes silicosis among other industrial diseases covered. The New York State code, which is serving as a model for many other states, has been liberalized to increase death benefits from $5000 to $6500. The matter of partial disability is receiving the attention of a committee of experts, and this is admittedly a very difficult and dangerous problem for the producer, since every employee might become a claimant for "partial disability."

The American Standards Association is attempting to establish a standard maximum concentration of silica particles per cubic foot, as a basis of safety, or industrial health,

(Continued on page 92)

Left to right, L. M. Hansen, George Thornton, treasurer of the association, and A. Warsaw

A group of delegates to the convention with C. M. Hardy in the foreground facing the camera

JULY 1944

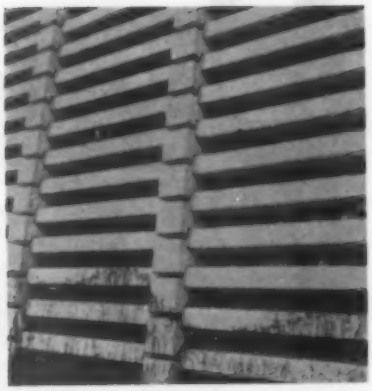
ROCK PRODUCTS' CONCRETE PRODUCTS AND CEMENT PRODUCTS

Storage yard of Jourdan Concrete Pipe Co., for both concrete pipe and pumiltite units

Large Market for Precast Concrete Cribbing

More than 50,000 reinforced concrete cribbing used by city of Minneapolis alone for revetments during 1941-42

By M. W. LOVING



Interlocking concrete cribbing. Old paving brick stretchers may be seen between stretchers

More than 50,000 reinforced concrete cribbing units were required to build the revetments to provide adequate storage space for the Municipal Coal Docks at Minneapolis, Minnesota, in 1941-42. The total cost of the improvement, including the concrete pavement for a strip approximately 300 ft. in width and excavation for same, was $393,000. Of this amount the City of Minneapolis contributed $158,000 and the W.P.A. $240,000.

Since 1930 many old masonry wing walls for bridge approaches have been rebuilt with reinforced concrete cribbing, and R. H. McHardy, assistant city engineer, has been in charge of such work, including the large improvement just mentioned. I was privileged to spend the day with him on May 26, 1944, and permission was secured by me from the U. S. Coast Guard to take photographs of reinforced concrete cribbing walls of the coal dock in the presence of a patrolman. Incidentally, that is not only required by law but saves a lot of trouble.

While I was taking the picture from a high bridge nearby, shown in one of the illustrations, someone phoned the police department "that a man is taking pictures from the bridge and a little man with blue overalls and a white cap is with him." Soon thereafter a patrol car drew up to the curb and two husky policemen jumped out ready for business. Then they saw the Coast Guard patrolman and I showed them a letter from the Captain of the Port; thus I was saved from a cold bath in the Mississippi River.

The accompanying illustrations show the extent of the project and how the cribbing walls are arranged; some are more than 30 ft. in height. The batter is 2 in. per ft.

Details of the two principal units, stretchers and headers, and how they are assembled are shown in Fig. 1. The rectangular cells when filled with granular material form a permanent gravity retaining wall. To prevent erosion of the soil mass back of the walls by seepage waters, old paving brick were placed edge to edge in the face of the walls between the stretchers at Minneapolis. Mr. McHardy said this scheme had worked fine and told me that no special foundations were required for the cribbing walls, as a stable or compacted soil foundation is adequate. The units are held together by friction which provides flexibility to the wall in case of slight settlement or frost heaving.

Constructing reinforced concrete cribbing walls is not difficult and requires no skilled labor or expensive equipment but the engineer in charge should see:

(1) That the walls are installed on firm foundations so graded that the toe of the wall is about 1 ft. higher than the heel, thus providing a batter of at least 2 in. per ft. of height.

(2) Because the pressure is greater at the toe of the cribbing or other wall it is desirable, especially for high walls, to employ two or more stretchers as "mud sills" at the toe and two at the heel of the structure.

(3) The engineer should check grade and alignment from the start and at frequent intervals during construction. To avoid unnecessary stresses on the lugs of the headers and to provide flexibility of the wall, it is desirable to place the stretchers about ¼ in. from the projecting lugs.

(4) Very high cribbing walls may be battered more than 2 in. per ft., or supplemental cribbing installed as shown in Fig. 2 so as to provide greater stability to the structure. Conversely, low cribbing walls may be provided with a vertical face.

(5) Gravel, crushed stone or other coarse granular material is the best to use for filling the cells in reinforced concrete cribbing walls. Rock may be used as it provides adequate seepage of water through the structure, but care should be exercised to avoid injury to or displacement of the cribbing units. The cells should be progressively backfilled up to and not less than 3 ft. below the top of the tiers during construction of the wall.

View of Minneapolis Municipal Coal Dock, showing cribbing installation

Advantages of Cribbing

Reinforced concrete cribbing is most commonly used on railways in congested terminal and industrial districts. The high cost of right of

way in such districts makes the extensive use of retaining walls imperative for elevation or depression of tracks to separate grades.

In the development of such projects it is frequently necessary to handle the work in a number of stages, in each of which embankments must be prevented from encroaching on adjacent tracks or construction work. Reinforced concrete cribbing walls are ideal for this use. For temporary work they can be laid quickly, easily and cheaply and such temporary use in no way impairs the value of the units for later use as permanent walls. Temporary walls can be moved as often as desired and eventually placed as a permanent structure. Then, again, in industrial and terminal districts minor readjustments of tracks are constantly being made, usually necessitating a retaining wall. Reinforced concrete cribbing offers the most economical solution of this problem. Such walls can be raised, lowered or entirely removed, and the units can be salvaged and used again.

Railway construction problems resulting from restricted right of way are by no means limited to big terminals or congested industrial districts. Retaining walls may be required at many points along the line by the proximity of a stream, another railway, a highway or other adjacent improvements. Reinforced concrete cribbing will be found economical for all such cases, but it is particularly applicable for two types of locations: First, along lines of heavy traffic, where interference to traffic, which would be unavoidable in the construction of a solid wall, is a very important consideration; and second, for outlying locations where it would be difficult to convey equipment for constructing masonry or other walls. Owing to their portability, reinforced concrete cribbing units can be delivered almost anywhere and erected without heavy equipment.

(Continued on page 86)

Arrangement of concrete cribbing walls. Stains on wall are caused by iron pyrites in coal

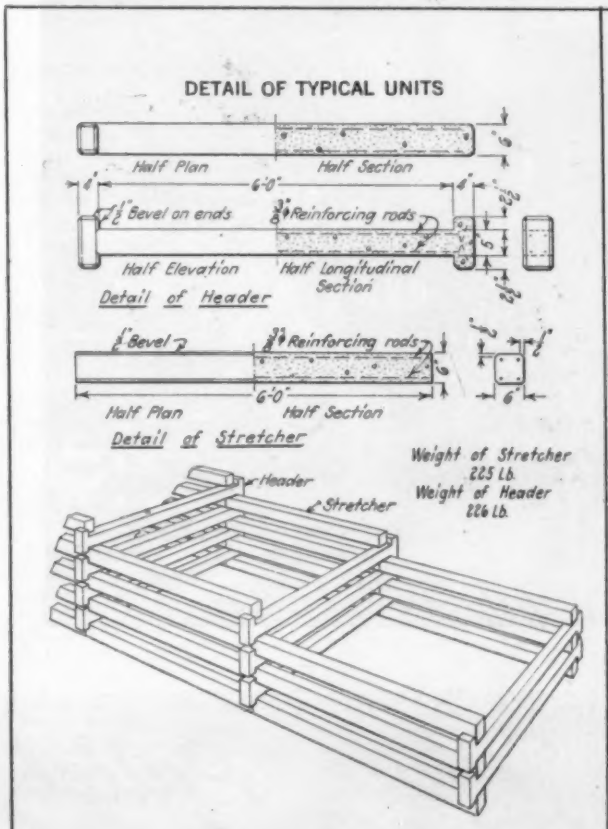
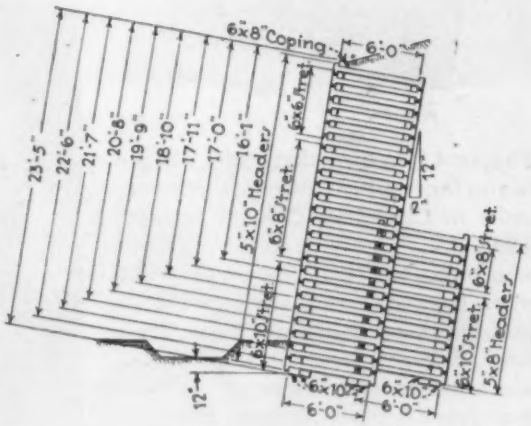


FIG. 1



HEIGHT OF WALL	UNITS REQUIRED FOR TYPICAL WALL 96' LONG				
	5"x10"x 6'-0" HEADERS	5"x8"x 6'-0" HEADERS	6"x8"x 6'-0" STRETCHER	6"x8"x 6'-0" STRETCHER	6"x10"x 6'-0" STRETCHER
16'-1"	289	68	192	416	64
17'-0"	306	85	192	400	128
17'-11"	323	102	192	400	176
18'-10"	340	119	192	400	224
19'-9"	357	136	192	400	272
20'-8"	374	153	192	400	320
21'-7"	391	170	192	400	368
22'-6"	408	187	192	400	416
23'-5"	425	204	192	400	464

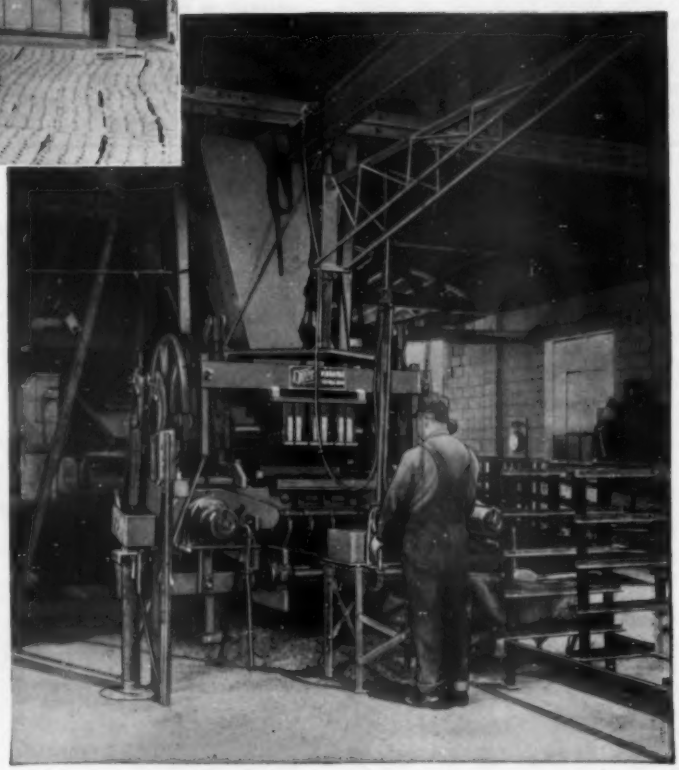
FIG. 2

Fig. 1: Manufacturing and installation details of concrete cribbing. Fig. 2: Method of installing supplemental cribbing to insure stability

LEADERS in the Concrete Products Industry

Mr. Lewis Mr. Minck

This is the 30th of a series of advertisements featuring leaders in the concrete products industry who have installed Besser Vibrapacs to step up production of high quality concrete masonry units. Reprints of previous advertisements sent on request.

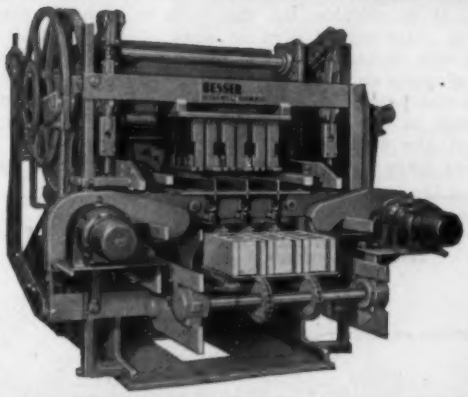


Fireproof Construction, Inc., began manufacturing Concrete Masonry units in Columbus, Ohio in January, 1942. Mr. P. J. Minck and Mr. R. Lewis who organized this company had formerly been in the cast stone specialties business in Indianapolis, Indiana. Their first—and only machine at present—was a Besser Super Vibrapac. In their first year of operation, more than 1½ million (8" or equivalent) units were produced. About 75% of present output is for war building construction and 25% for farm and private buildings.

—using Besser Plain Pallet VIBRAPACS in War Production

Concrete Masonry Units Tried By Fire....

The Avalon Country Club, near Indianapolis, Indiana, burned in 1928. The construction was concrete pilasters and floors with outside walls and partitions of lightweight concrete masonry units. The fire destroyed inside woodwork and roof. It was reconstructed in 1929, retaining all former concrete masonry. This Club was renamed in 1934 and is now Hillcrest Country Club. Photographs show the building after fire and as it is now—fifteen years later.



Besser Super Automatic Plain Pallet Vibrapac. Capacity 600 8" x 8" x 16" per hour made 3 at a time on one plain pallet. Smaller units made in larger multiples on the same pallets.

Important Patent Notice

Licensed under the Gelbman basic vibration patents.

Undirectional vibration licensed under Flam patents.

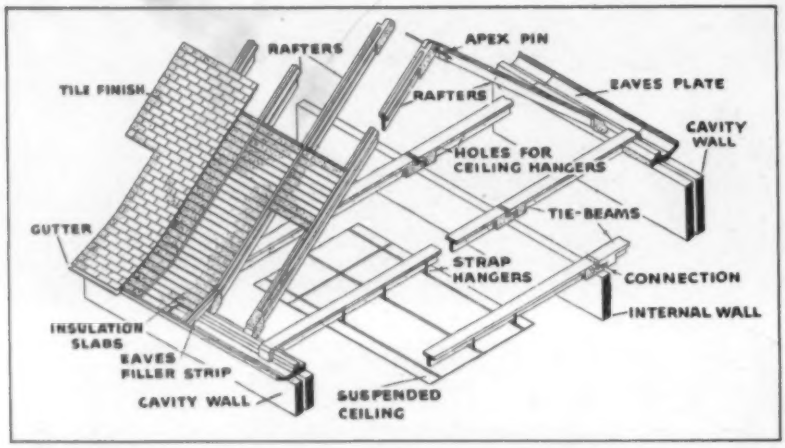
The Vibrapac combines vibration with exclusive patented Besser Plain Pallet principle.

BESSER MANUFACTURING CO.

207 Forty-Fourth St. • Alpena, Mich.

Complete Equipment for Concrete Products Plants

THE SAVING IN PALLET COST WILL PAY FOR A BESSER VIBRAPAC PLAIN PALLET STRIPPER



Roof construction details showing how lightweight precast concrete joists, rafters, tile and insulation slabs are installed

Precast Concrete Roofing

British Cast Concrete Federation develops system of precast concrete roof construction

CONFRONTED with the problem of supplying housing to agricultural workers and faced with a shortage of lumber, the Ministry of Works has collaborated with the British Cast Concrete Federation in the development of a novel precast concrete pitched roof construction. The same design, of course, is suitable for other types of housing in cities where the need is very acute.

In this design no lumber is required, it is suitable for use with plain or interlocking tiles or slate, and it will accomodate the normal range of spans encountered in houses of this character. As pointed out in an article in the *Architect*, London, England, the weights of the precast members have been restricted to a range which may be handled by two men. A planned system of erection has been worked out whereby complete roof erection may be done by one skilled and two unskilled operatives.

Construction

This system is designed to make the construction of pitched roofs practicable under war-time conditions, employing traditional materials. The finished roof is more permanent than a similar structure using lumber and it has a much higher degree of fire resistance.

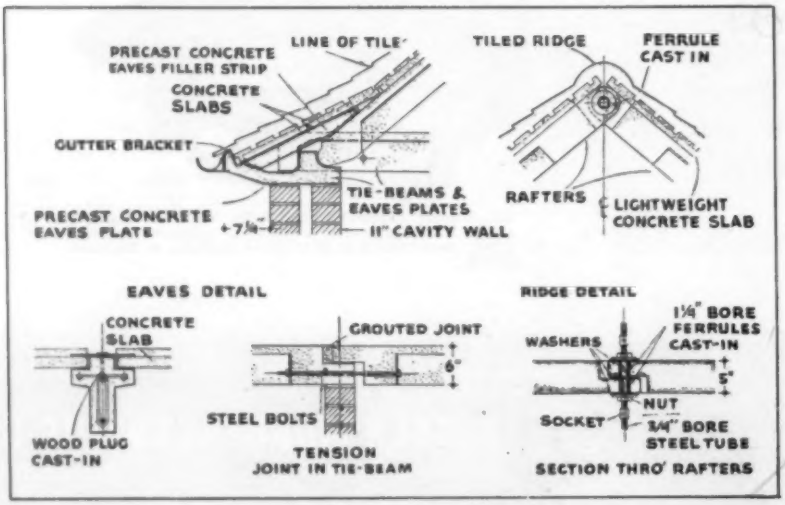
In the accompanying illustration may be seen the details of the roof construction. The precast concrete eaves plates, 4 ft. 4 in. long, are supported on top of the cavity exterior walls. Plates are held in position by interlocking tie-beams at intervals between gables, and by tie-rods at the gable ends. The weight of the plates is 237 lbs.

Precast concrete tie-beams, it will be noted, span the external and are located in slots in the eaves plates. Slots in the eaves plates occur at the ends, and each tie-beam is therefore bearing on two plates at each end. Tie-beams are formed of two units bolted together. The joint may be arranged to occur over an internal wall, but this is not essential. The web of the tie-beams is pierced with holes to provide attachment for ceiling hangers, and to allow conduit to be passed through. Tie-beams weigh about 20.6 lbs. per lineal foot.

Precast concrete rafters are located at the eaves in the plates, and jointed at the apex by threaded tubular studs passing through ferrules cast into the rafter ends. The stud to each pair of rafters is fixed to the stud on either side by screwed sockets. The eaves end of each rafter is finished to a radius ending in a radial groove in the eaves plate. By this arrangement the pitch of the roof may be modified within limits to accommodate variations in span. An 11 ft. 9 in. rafter provides a 40 deg. pitch on an internal building span of 17 ft. 3 in. Rafters weigh about 188 lbs.

Support for the tiles or slate and thermal insulation is provided by either light-weight concrete slabs or some other fiber board product. With light-weight concrete slabs, slots are located in each slab to take the tile nibs. These concrete slabs are 2 ft. by 1 ft., by 1½ in., and weigh 18 lbs. per unit. Coefficient of thermal transmission is 1.75 B.t.u. per inch thick, per ft., per hour deg. F. The slabs are fixed to the rafters by 16-gauge metal strip clips, screwed to wood plugs cast in the rafters.

A typical 40 deg. pitched roof, covering a dwelling area of 485 sq. ft., with a 17 ft. 3 in. clear span between walls, and 27 ft. 6 in. long between gable ends, requires the following materials: Concrete, 102 cu. ft.; steel reinforcement, 656 lbs.; plain tile finish, 4500 tiles; and total weight of roof, 16 tons. The cost is about the same as for similar timber construction with the same insulation.



Cross sections of precast concrete roof units

Big Texas Water Projects

IN A REPORT to Congress, the Reclamation Bureau recommended 11 specific developments in Texas estimated to cost $112,000,000. These projects point to a tremendous market for concrete pipe in this state when the work gets under way. One of the projects already authorized by Congress is Valley gravity canal and storage reservoirs along the Rio Grande from a point near Laredo to the mouth of the river, estimated to cost $62,500,000.

New pipe and concrete block manufacturing plant and outside pipe storage. To the left is the tractor and semi-trailer equipment used to haul pipe and block to destination

Combine Block and Pipe Production

Flamingo Concrete Pipe Co., Sanford, Fla., has four block machines and one pipe machine

ONE of the most recently completed plants for the manufacture of concrete pipe is that of the Flamingo Concrete Pipe Co., Sanford, Fla. This is a new unit of the parent company, the Universal Concrete Pipe Co., Columbus, Ohio. In addition to concrete pipe, the plant makes a complete line of concrete masonry products.

The building itself is of considerable interest as it is made of concrete block with frequently spaced pilasters of block in the walls which are adequately reinforced to withstand any wind storms to which the building might be subjected. As shown in the illustration, it is a one-story structure with a raised roof in the center to give sufficient headroom for machinery. A lean-to office of concrete masonry is located near the center and directly connected to the main building so that a good view may be obtained of the storage yard as well as easy access to the manufacturing plant building of which it forms a part.

Ever since August 13, 1943, when the Flamingo Concrete Pipe Co. produced its first pipe, this plant has been receiving record orders. Pipe are made on a Universal concrete pipe machine, made by the parent company. Concrete for the machine is supplied from a 28 cu. ft. mixer and elevated to the pipe machine feeder hopper by an electric skip hoist. Two pipe buggies are used to transport pipe from the machine to the curing room where the form is taken off the pipe and returned to the machine. Aggregates include a minus ¾-in. gravel and concrete sand. For the preparation of wire reinforcement cages, the company has a wire forming roll and a Thompson-Gibbs electric spot welder.

As soon as the concrete pipe have been placed in the curing room and its initial set has taken place, an automatic overhead water spray system sprinkles pipe continually for 72 hours. After the curing period has been completed, a hydraulic lift truck hauls the pipe to outside storage yards. A fleet of eight tractor trucks and semi-trailer units is employed to deliver concrete pipe and concrete block to destination.

Two Appley-Owens vibrating block machines and two F. C. George Manufacturing Co. vibrating machines are used in the concrete block manufacturing department. The Appley-Owens machines each have a capacity of from 100 to 120 standard 8- x 8- x 16-in. units or equivalent per hour. The same water spray curing system employed for pipe is used to cure the block. Blocks are removed to the yards with hydraulic lift trucks.

Official personnel includes Walter Johnson, sales and operating manager; Arnold McComas, superintendent; Jim Brodie, mechanic foreman; and Theo. Gibson, in charge of the office.

Side view of pipe and block plant showing concrete block pillar construction supporting roof. To the right may be seen equipment for handling pipe

Three types of concrete hog trough sold as a side-line

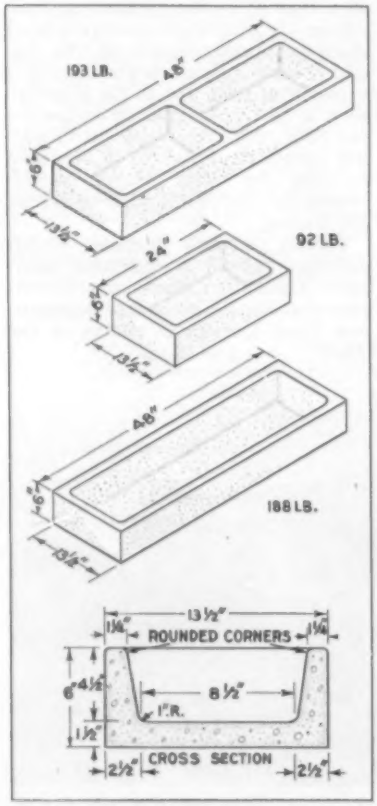
Concrete Hog Troughs

THE MICHIGAN SILO CO., Peoria, Ill., ran a freeze test on a hog trough all last winter and has reported good results.

The new trough is made in three designs with one mold. Using a wet mix of 1 part cement, 1 part buckshot gravel, and 2 parts sand, vibrated in a metal mold, a trough 4 ft. long, 14 in. wide, and 6 in. high, with a capacity of 7 gallons, is made. By using a partition in the same mold a two-compartment trough with a capacity of 6 gal. is produced.

A 3-gal. trough is made by using a divider in the partition, making two troughs, each 2 ft. long, in one cast.

The Michigan Silo Co. also makes silo staves, concrete blocks, chimney blocks and other concrete specialties. Emil F. Zuber is general superintendent.



Construction details of three types of concrete hog trough

Cement Bids for Oregon

ANNOUNCEMENT has been made by the Bureau of Reclamation that bids have been received for furnishing 40,000 bbls. of modified portland cement in paper sacks for use on the north unit of the Main canal of the Deschutes project. The cement is to be shipped either f.o.b. cars at shipping point or f.o.b. Terrebonne, Ore. Bids are as follows:

Oregon Portland Cement Co., 111 S. E. Madison St., Portland, $2,908, destination shipping from Oswego or Lime, Ore., net; Pacific Portland Cement Co., $2.908, f.o.b. destination shipping from Gold Hill, Ore., or Redwood Harbor, Calif., net; Monolith Portland Cement Co., $2.58 for Laramie, Wyo., 10c bbl. cash discount; Permanente Cement Co., $3.32 f.o.b. destination, f.o.b. Permanente, net; Calaveras Cement Co., $3.12 f.o.b. destination shipping from Kentucky House, Calif., 10c cash discount. All bids stated immediate shipment.

Safety Meetings

AN ACCIDENT prevention conference was held recently by the Portland Cement Association in Pittsburgh, Penn., with 35 leaders representing five plants in this area. Speakers included Howard Kelly, George Patton, G. W. Grove, A. J. R. Curtis, and Floyd R. Frazier. Frank L. Maus was general chairman. This is one of a series of meetings to be held.

Big Cribbing Market

(Continued from page 81)

Reinforced concrete cribbing offers a logical solution for the problem frequently encountered when two tracks or roadways closely adjacent have to be operated on different levels. There are many locations on any railroad where the fill is encroaching on property which could be used for other purposes but where the cost of masonry or other retaining walls would be prohibitive. A crib wall in such a location pays for itself in a very short time.

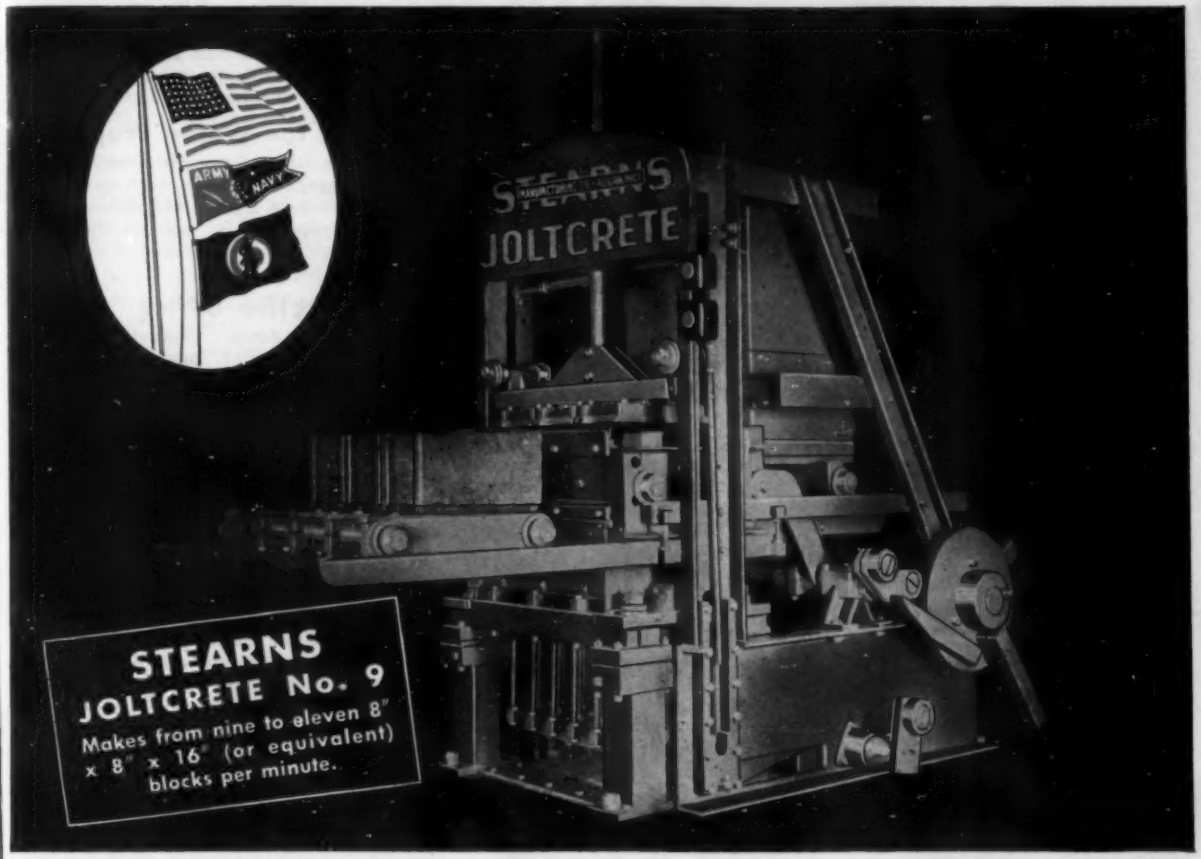
Cribbing Manufacture and Curing Method

Manufacture of reinforced concrete cribbing units for the Municipal Coal Docks in Minneapolis and for other work since 1930 was under the supervision of Mr. McHardy at the plant of the Massey Concrete Products Company in that city. That company has had wide experience in the manufacture and installation of reinforced concrete cribbing for railroads and other installations throughout the United States and Canada. Much of the material for the preparation of this article, including Figs. 1 and 2, was furnished by that company.

The units were made with a concrete mixture of 1:2:2.5 or about seven sacks of portland cement per cu. yd. of concrete, placed with vibrators. They were steam cured for 24 hours and kept constantly wet with water spray, during dry weather, for more than 12 days. The average strength of the concrete exceeded 5000 p.s.i. and is very dense and impermeable.

Mr. McHardy and I examined the units in many of the installations in Minneapolis and vicinity and they were in excellent structural condition. The stains shown on some sections of the walls of the coal docks are caused by deposits of Marcasite, iron pyrites deposits from solution of seepage waters from the coal. We scraped off these deposits and found the concrete in excellent condition.

Close-up of headers and stretchers



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● *Today*, with its *Automatic Power Carriage Drive* and *Power Off-Bearer*, it is making new and impressive cuts in labor costs.

● *Simple in design*, this machine has weight where weight is needed. Special alloys are used for parts subjected to severe wear. In brief, Joltcrete No. 9 provides for lower production and maintenance costs than ever before obtained.

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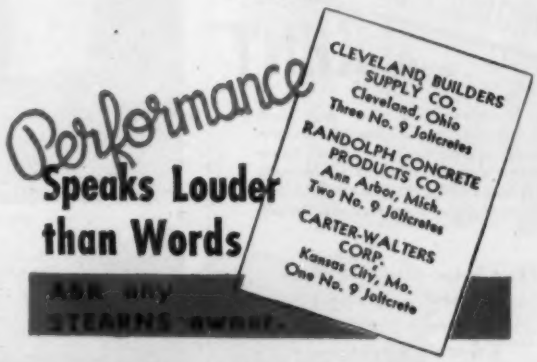

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Big Airfield Improvements

TYPICAL of some of the larger airfield extension and improvements contracts are those recently let by the War Department in Texas, Nebraska, and Washington. An expenditure of $1,288,640 will be made for improving the runways and drainage at Fort Crook in Nebraska. Hangar improvements at Dalhart Airfield in Texas will cost $593,000. Improvements at Boeing Field in Washington, including construction of additional parking apron and taxiways, will amount to $2,670,000.

Resume Cement Operations

ASH GROVE LIME & PORTLAND CEMENT Co., Chanute, Kans., resumed operations on June 16, according to an announcement made by Guy O. Gardner, superintendent. This plant stopped production of cement on February 1, but retained employes for a two-month period to make repairs.

Consider Texas Pipe Plant

UNIVERSAL CONCRETE PIPE Co., Columbus, Ohio, is considering the establishment of a permanent plant in Sweetwater, Texas, according to Joe B. Wies, production superintendent for the company's plants at Abilene and Amarillo. It is reported that the plant will cost from $150,000 to $200,000. Hillside Sand and Gravel Co. will furnish the aggregates.

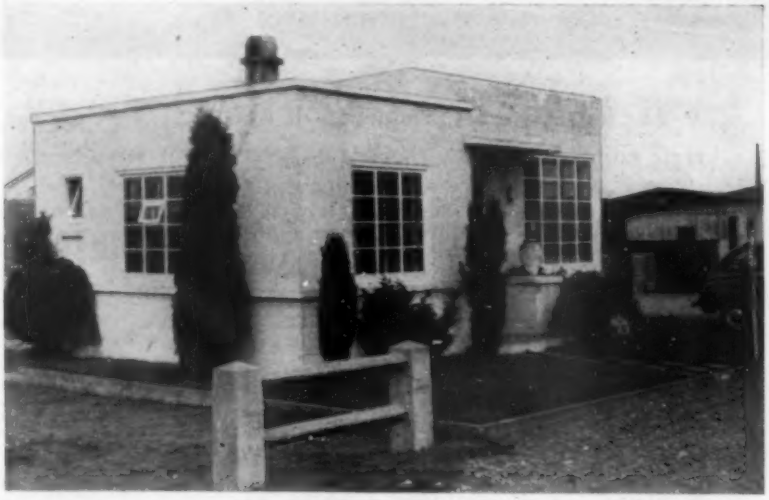
Pipe for Water Project

ELK RIVER CONCRETE PRODUCTS Co., Billings, Mont., has been given the contract to supply $16,991 worth of concrete pipe for use on the Alder project of the Montana water conservation board.

Attractive Office

F. R. ZAUGG, concrete products manufacturer of Tacoma, Wash., has one of the most attractive and modern offices of any concrete products manufacturer on the Pacific Coast. Too often offices and factories of concrete products manufacturers are constructed of materials other than those which they produce which is hardly an advertisement of their business. Mr. Zaugg believes that there is no better advertisement of the product than its attractive use by the manufacturer, such as his office.

The next best advertisement is an attractive building in which your products are used. Shown below the office is an attractive chapel and office in a cemetery near Tacoma, Wash.



Above: Attractive office building of F. R. Zaugg, concrete products manufacturer of Tacoma, Wash. Below: Chapel and office in cemetery near Tacoma constructed of concrete masonry

Heat Transmission of Concrete Masonry Walls

TO CONCRETE MASONRY unit manufacturers, the subject of heat transmission through walls is important and the National Concrete Masonry Association has given it considerable attention. Every salesman must have sufficient knowledge of the subject to talk intelligently to architects, builders, and heating and ventilating engineers.

Thermal properties of concrete walls, it has been pointed out, may be improved by constructing the walls with different types of air spaces, by using an aggregate that has low heat transmission qualities, and by the application of an insulating material into the walls or on the faces of the wall.

Concrete made with porous aggregate will result in lower heat transmission than dense aggregates, but excessive porosity may allow heat to be transferred through a wall by air circulation. This condition can be corrected, however, by application of an impervious surface, such as painting with a portland cement paint. The two types of air spaces built into the wall are represented by the hollow double wall and the cored out sections as provided in single wall construction. Insulation materials may be applied as a loose fill material in the core spaces and as a rigid insulation applied to the inside face exterior walls, in some cases being furred out to provide an air space.

Face shell mortar bedding is to be preferred to full mortar bedding to get the greatest insulating value. Carelessness in dropping mortar in the core spaces during construction must be guarded against because if enough is dropped over door and window openings the thermal conductivity may increase to such an extent that condensation of moisture may occur at these points.

Table I (page 90), gives coefficient of heat transmission *U* of several types of concrete masonry walls, assuming an outdoor wind velocity of 15 miles per hour. The lower the decimal values, the better the construction from the standpoint of retarding passage of heat.

Comparing the values of the table for concrete masonry walls, standard wood frame construction ¾-in. plaster on metal lath has a heat loss of 0.26 B.t.u. per sq. ft. per hour; wood frame construction with 4-in. brick veneer in place of siding has a heat loss of 0.28; and 8-in. solid brick wall with furred metal lath and ¾-in. plaster has a heat loss of 0.32. It was pointed out that the concrete masonry walls constructed with consideration for insulating values compare favorably with other constructions. One of the facts brought out in University of Minnesota investigations was that filling the cores of standard 3-oval core 8- x 8- x 16-in. units with granulated cork, rock wool or similar granular or loose fill material of equivalent insulation values would reduce heat losses as compared to plain concrete masonry walls by approximately 50 percent.

As an example, consider the case of a hollow double wall comprising two 4-in. walls with a 1-in. continuous air space. When plastered direct, the coëfficients of thermal conductivity are 0.27 and 0.24 for cinder and Haydite masonry wall, respectively. However, if the air spaces are filled with granular insulation, heat losses are only 0.17 and 0.15 B.t.u. per hr.

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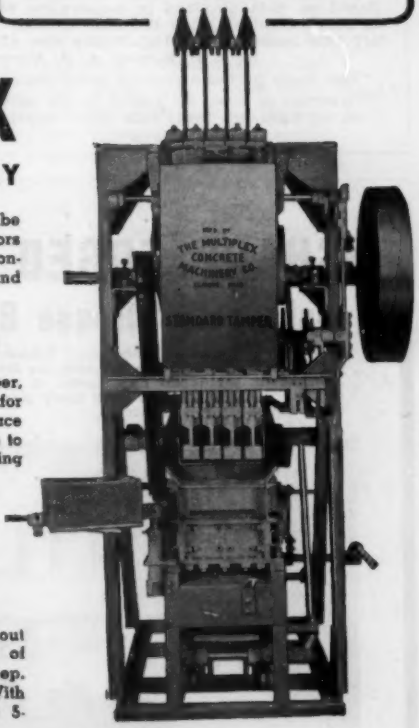
The MULTIPLEX 8-bar Standard Tamper, shown here, is a Universal machine, for making both plain and stripper, or face blocks, on one base. Produces from three to four 8 x 8 x 16 in. units a minute. Time-feeding while tamping and hopper agitation make better units. Strike-off hopper assures a smooth top. Has rugged, all-steel welded frame and reinforced moldbox.



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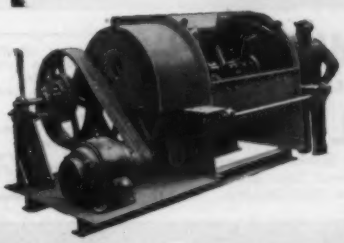

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TABLE 1—HEAT TRANSMISSION OF VARIOUS TYPES OF CONCRETE MASONRY WALLS

Coefficient of Transmission U of Concrete Masonry Walls, Wind Velocity 15 Mi. Per Hr.

Basic Wall Construction (See Note)	Cores of Units Not Filled — Interior Finish					Granular or Loose Fill in Cores** — Interior Finish				
	Plain* Wall, No Plaster	½-in. Plaster on Wall Direct	½-in. Plaster on Furred Metal Lath	½-in. Plaster on Furred Rigid Insulation ½-in.	½-in. Plaster on Furred Rigid Insulation 1-in.	Plain Wall, No Plaster	½-in. Plaster on Wall Direct	½-in. Plaster on Furred Metal Lath	½-in. Plaster on Furred Rigid Insulation ½-in.	½-in. Plaster on Furred Rigid Insulation 1-in.
8-in. Concrete Masonry Walls. Aggregate:										
Cinder	.40	.37	.27	.20	.16	.20	.20	.17	.15	.11
Haydite	.36	.34	.25	.19	.15	.18	.18	.15	.13	.11
Sand or Limestone	.53	.49	.32	.24	.17	.38	.36	.26	.20	.16
9-in. Double; 4-in. C/M Walls with 1-in. air space. Aggregate:						Granular or Loose Fill in 1-in. Air Space				
Cinder	.28	.27	.21	.16	.13	.18	.17	.14	.12	.11
Haydite	.25	.24	.19	.15	.12	.15	.15	.13	.11	.10
Sand or Limestone	.40	.37	.27	.20	.16	.25	.24	.19	.15	.12

NOTE: Concrete masonry walls built with units made of standard light-weight aggregates have heat transmission coefficients comparable to the walls made of cinder and Haydite units.

The values underlined in the table indicate actual test results. Other values calculated using these values as a base. All values are based on units with one air cell in the direction of heat flow.

Based on data obtained in cooperative research sponsored by the American Society of Heating and Ventilating Engineers in cooperation with the Portland Cement Association and the University of Minnesota. The report was published in the January 1936 issue of "Heating, Piping and Air Conditioning" under the title, "Thermal Properties of Concrete Construction," by F. B. Rowley, A. B. Algren and Clifford Carlson of the Engineering Experiment Station staff.

*Two coats portland cement paint reduce the value of U on plain concrete masonry walls .02 to .03 B.t.u.

**Granular or loose fill placed in the cores of the 8-in. units or in the 1-in. air space of double wall construction consisting of regranulated cork, rock wool, expanded micaceous shale or similar materials having equivalent heat loss coefficient.

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A typical in-between-sessions group of industrial sand producers at Hot Springs meeting

Industrial Sand

(Continued from page 78)

codes. It seemed to be the concensus of opinion at the meeting of sand producers that this was hardly a legitimate function of the A.S.A.

Mr. Waters also discussed the efforts of the industrial sand industry for several years past to get action from the insurance companies to reduce rates for silicosis coverage, which long experience shows are unjustifiably high. These high rates would be particularly burdensome if there should be a depression, requiring the layoff of a considerable number of employes. Such periods are usually marked by an increased number of claims.

In the general discussion which followed it was apparent that there is everywhere a tendency to liberalize the laws dealing with industrial hazards and diseases, from the point of view of the employee, with rising benefit payments on the part of the employer. There is much pressure from the Federal Government on the state legislatures in this direction. Court decisions in industrial compensation cases are definitely more liberal. Mr. Waters said employers must recognize that the labor viewpoint is constantly making progress.

He said it was the employers' obligation to try for the best possible experience record, even if the insurance companies do make the payments. A pressing post-war problem, on which the insurance companies and employers should prepare some program to meet, is that of rëemployment of physically handicapped service men. Such men as are already physically disabled may be capable of useful employment but insurance companies will be reluctant to give them coverage. Possibly there will be spécial funds appropriated by the states to take care of such cases.

Government Regulations

V. P. AHEARN, executive secretary, reported on the priorities and price regulations. The members of the industrial sand industry seem to have had little difficulty in procuring absolutely essential machinery, equipment and supplies, except that the number of shovels, cranes and trucks allotted to industry is still short of

(Continued on page 94)

Improve Handling Methods Speed Production with . . .

The more difficult and varied the job in the stone products industry, the greater the need for the diversified line of Jeffrey material handling and reduction units, capable of carrying through every step of the process. For high productivity . . . specify Jeffrey.

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CHAINS
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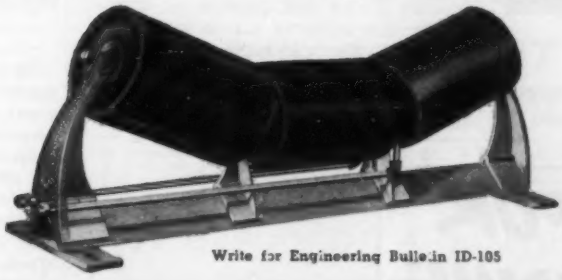
Solve Your Haulage Problems



Write for Engineering Bulletin ID-105

INDUSTRIAL DIVISION
CONTINENTAL GIN COMPANY
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SELECTRO AND GYROSET

VIBRATING SCREENS IDEALLY SUITED FOR TURNING OUT TODAY'S PROFITABLE "SPECIALS"

The "specials" — agricultural limestone, filter sand, stone-sand and many other types—offer some of today's most profitable markets. Rigid specifications for these specials call for careful handling — most important of which is in the screening. When it comes to that, SELECTRO and GYROSET Self-Cleaning Vibrating Screens are ideally suited. They make it possible to screen materials to closest tolerances, give amazing performance where blinding would normally occur, and assure absolute control over the product.

1. ADJUSTABLE PITCH—screen may be tilted 40° from horizontal in either direction while machine is in operation.
2. STROKE ADJUSTMENT—can be quickly changed to eight distinct intensities, enabling a light vibration or a coarse, heavy throw.
3. FLOATING SHAFT—totally enclosed, operating outside the flow of materials.

PRODUCTIVE EQUIPMENT CORPORATION
2920-28 W. LAKE ST. CHICAGO 12, ILL.

Immediate Shipment—No Priority

1—Practically new Hercules Revolving Washing Trommel 40" x 16'.. Main clyinder is perforated 12' of its length with ⅜" diameter holes. 59" O. D. outer frame x 10' long for screen cloth (screen cloth not furnished). Complete with a 250-rpm., 3-hp., 60-cy., 440-v. General Electric Gear Motor and chain drive. This screen is in excellent condition, having been operated only a short time. May be purchased without priority.

Accessory equipment for this trommel consists of: Structural steel frame work for stacker and trommel including a 3000 lb. pull State Hoist.

DENVER EQUIPMENT COMPANY, 1400 17th St., Denver 2, Colorado

To the left, Alfred J. Miller, having a chat with Hamilton Allport

requirements. Some little difficulty seems to have been experienced in getting repair parts for machinery in the L-192 lists (shovels, cranes, etc.) due to confusion within the W.P.B. All requests for such parts, which are processed through the construction machinery division, should contain a notation that they are authorized under P-56 (the mining machinery division).

The matter of price changes in the industrial sand industry aroused few inquiries, and apparently the procedure is now well understood. Curiously, the industry comes under M.P.R. 188, which is supposed to cover building materials.

Most of a half-day's session was devoted to a round-table discussion of the labor problems of the various member companies and of the labor situation generally. The matter of vacations with pay was discussed. In several instances it was mentioned that employes preferred the extra week's or two week's pay in lieu of vacation. Then the question arises—pay for a 40-hour week or weeks, or 48-hour week? If the plant is regularly working 48-hour shifts, the logical answer seemed to be vacation pay for 48 hours.

Labor Problems

In the general discussion of union contracts there appeared to be no great objection to maintenance of membership clauses, or even closed shop, but opinion against the check-off system, as unfair to the worker, was often expressed. In any union contract the employer should be certain that his rights of management are as amply protected as the rights of the worker. This particularly concerns the seniority problem, which the unions have pushed to the forefront. Their desire is to make seniority the sole criterion for promotion. Of course, every employer knows, that for successful operation, there are more qualifications and more important ones than seniority.

The employer should always protect his responsibility for management by proper clauses in the contract, stating for example, that layoffs are to be in accordance with seniority, except in such instances as strict application of this policy would seriously impair the efficiency of operation. That in filling higher positions, the employer is to receive applications direct, and the applicant's qualifications are to govern, other things being equal. In other words "maintenance of management" clauses in contracts, as Secretary Ahearn expressed it, are just as important to the public welfare as maintenance of union membership.

There was some discussion of pay differentials between the regular day shift and the night and early morning shifts. These differentials seem fairly widely recognized except where the shifts rotate; then the differentials are not essential.

The meeting discussed at some

Russell Hay, V. P. Ahearn, and L. M. Hansen

This semi-portable arrangement of Frank S. Tillman in Dayton, Ohio, is a working example of how Lippmann portable crushing and screening plants can be combined with Lippmann portable washing plants for high speed production of high quality aggregates even where conditions of the deposit and material make the toughest going.

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Dual
CRUSHING AND SCREENING PLANTS

Producers get the finest in crushing and screening equipment in Lippmann Portable Plants. Compactness has been achieved with greatest ruggedness and efficiency of operation. All units are always ready to move with no loading or setting up expense. All can be arranged for producing one, two or three sizes of material. All utilize both jaw and roll crushing.

Study the details of the sturdy construction throughout Lippmann Portable Plants and note their efficient operation and unique mobility. Write today for a copy of our catalog.

CRUSHING, WASHING AND SCREENING PLANTS
Portable, Semi-Portable & Stationary
CRUSHERS & PULVERIZERS
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CONVEYORS & ELEVATORS
SAND CLASSIFIERS
LOG WASHERS

LIPPMANN ENGINEERING WORKS
4603 W. MITCHELL STREET • MILWAUKEE, WIS.

length the possible benefit of research on sand for sand blasting by the Industrial Hygiene Foundation. Such research would survey blast sand uses, the equipment, hazards, protection, etc., with the objective of reëstablishing some of this market lost to steel shot manufacturers. This research will probably be started soon.

The only other business having to do with uses of industrial sand, considered at this meeting, was a report by STANTON WALKER, consulting engineer of the Association, on foundry sand tests. Mr. Walker revamped and simplified a more formal paper that he presented to the American Foundrymen's Association in 1941 on the reproducibility of tests of foundry sands—with particular reference to sieve tests. Some 26 laboratories showed a wide range of results on parts of the same sample.

This variability in sieve tests of minus No. 20 mesh sand is very interesting, not only to foundry sand producers, but to concrete and masonry sand producers, and will be referred to later in the current series of articles now running in this journal on "Sand Separation."

Registration

The following members and guests were present:

V. P. Ahearn, National Industrial Sand Association, Washington, D. C.

(Continued on page 96)

ATTENTION!

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- MASTER MECHANICS
- SUPERINTENDENTS

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THE WELDERS' GUIDE

The sensational eight-page newspaper. It contains many photographs showing all the latest tricks in manganese welding, as well as a Beautiful Photograph of

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150-200 TONS OF CRUSHED ROCK PER HOUR

Steam Shovel sizes to 5" to 6" minus in one-operation

These heavy plate and cast steel constructed roller bearing JAW CRUSHERS have tremendous crushing power. Built to take it for continuous operation with minimum maintenance. Built in all sizes, stationary or portable.

Complete weight of 25x42 JAW CRUSHER is 54,200 lbs.

Mfgrs. of Double Roll Crushers and Hammer Crushers for Secondary Crushing requirements.

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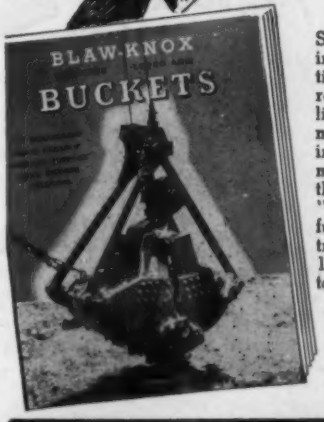

Sealed ball bearing sheaves in the lever arm reduce lost time and expense of bearing replacement, increase cable life and reduce friction, materially improving operating efficiency. This, and many other better features, that make BLAW-KNOX the "wise" buy in buckets are fully explained and illustrated in NEW CATALOG 1757. Send for your copy today.

BLAW-KNOX DIVISION
of Blaw-Knox Company
Farmers Bank Bldg.
Pittsburgh, Pa.

BLAW-KNOX
BUCKETS

Industrial Sand

(Continued from page 95)

Hamilton Allport, Standard Silica Corporation, Chicago, Ill.

E. T. Andrews, Pennsylvania Glass Sand Corporation, Mapleton Depot, Penn.

William M. Avery, Pit and Quarry, Chicago, Ill.

N. C. Bos, John N. Bos Sand Company, Chicago Ill.; and Producers Core Sand Corporation, Michigan City, Ind.

E. J. Campbell, The Sun Sand Company, Thayer, W. Va.

Harte Campbell, The Sun Sand Company, Thayer, W. Va.

J. A. Cleary, Sand Products Corporation, Cleveland, Ohio.

John D. Cronenweth, Great Lakes Foundry Sand Company, Detroit, Mich.

Louis Dill, George F. Pettinos, Inc., Philadelphia, Penn.

E. M. Durstine, The Keener Sand and Clay Company, Columbus, Ohio.

A. N. Farmer, Sand Products Corporation, Cleveland, Ohio.

Stirling N. Farmer, Sand Products Corporation, Cleveland, Ohio.

E. W. Finkbiner, South Jersey Sand Company, Philadelphia, Penn.

A. Y. Gregory, Whitehead Brothers Company, New York, N. Y.

C. M. Hardy, Hougland & Hardy, Evansville, Ind.

Harry Hardy, Houghland & Hardy, Evansville, Ind.

Russell G. Hay, Ayers Mineral Company, Zanesville, Ohio.

L. M. Hansen, Industrial Silica Corporation, Chicago, Ill.

C. P. Helmick, The Keener Sand and Clay Company, Columbus, Ohio.

T. C. Matthews, Pennsylvania Glass Sand Corporation, Lewistown, Penn.

Alfred J. Miller, Whitehead Brothers Company, New York, N. Y.

P. W. Palmer, Browntown Silica Company, Browntown, Wis.

Nathan C. Rockwood, Rock Products, Chicago, Ill.

A. B. Schlesinger, New Jersey Pulverizing Company, New York, N. Y.

E. O. Schneider, Ottawa Silica Company, Ottawa, Ill.

Wm. Sherratt, South Jersey Sand Company, Philadelphia, Penn.

Harry F. Spier, New Jersey Pulverizing Company, New York, N. Y.

J. M. Strouss, Deckers Creek Sand Company, Morgantown, W. Va.

C. W. Thompson, New Jersey Silica Sand Company, Millville, N. J.

George A. Thornton, Ottawa Silica Company, Ottawa, Ill.

Henry C. Thornton, Ottawa Silica Company, Ottawa, Ill.

Stanton Walker, National Industrial Sand Association, Washington, D. C.

A. Warsaw, Wedron Silica Company, Chicago, Ill.

T. C. Waters, Baltimore, Md.

Clarence R. Wolf, New Jersey Silica Sand Company, Millville, N. J.

Wm. J. Woods, Pennsylvania Glass Sand Corporation, Lewistown, Penn.

WANT THE "KNOW ALL" ON REX MOTO-MIXERS?

SEND FOR THIS *Free* BOOK

HERE'S the book that gives you the complete story of the Rex Moto-Mixer . . . the truck-mounted mixer that helps speed up the mixing, hauling and placing of concrete!

It gives you detailed information and illustrations on such outstanding features as the Rex end-charging design . . . Hi-Lo mixing action that makes mixing faster and more efficient . . . revolutionary visible mixing . . . 100% accurate water system . . . unrestricted discharge . . . the five-in-one Quint spout . . . the one and only chain belt drive that cushions shocks and prolongs life . . . and many other exclusive advantages.

You'll find specifications and valuable engineering and design features explained in this informative book, plus many interesting job pictures. Send for your copy. Write Chain Belt Company, 1649 West Bruce Street, Milwaukee 4, Wisconsin.

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of Milwaukee

REX CONSTRUCTION MACHINERY
PUMPS PAVERS PUMPCRETES MOTO-MIXERS MIXERS

Cement Production Less

BUREAU OF MINES reports that the production of finished portland cement during April, 1944, was 6,463,000 bbl., or 42 percent below output in the corresponding month of 1943. The April production was nearly 1,000,000 bbl. below the quantity shipped from mills during the month. Mill shipments of 7,373,000 bbl. in April, 1944, were 42 percent lower than in the same month of 1943. Stocks of finished cement at mills on April 30 declined nearly 1,000,000 bbl. from March 31 to a total of 24,085,000 bbl. However, the April 30 stocks were 7 percent above the quantity on hand on the same date of 1943.

The following statement gives the relation of production to capacity, and is compared with the estimated capacity at the close of April, 1944, and of April, 1943:

RATIO (PERCENT) OF PRODUCTION TO CAPACITY)

	Apr. 1943	Apr. 1944	Mar. 1944	Feb. 1944	Jan. 1944
The month	55.0	32.0	29.0	29.0	30.0
12 months	72.0	46.0	47.0	49.0	51.0

Pavement Yardage

AWARDS of concrete pavement for May, 1944, have been announced by the Portland Cement Association as follows:

SQUARE YARDS AWARDED DURING MAY, 1944

Roads	671,969
Streets and Alleys	582,832
Airports	1,352,422
Total	2,607,223

Moves Offices

SCHELLBERG SAND & GRAVEL CO. has announced that its new general office will be Box 482, Fremont, Nebr. The company's offices were formerly located in the Redick Tower, Omaha, Nebr.

WELLMAN WILLIAMS TYPE BUCKETS

BUCKET QUALITY BACKED BY TWO FAMOUS NAMES

Williams Buckets have been famous for nearly 40 years for their many mechanical features.

Since 1931, Williams Buckets have been built by Wellman, known for many great engineering achievements in the heavy iron-ore, coal, and steel industries. The welded construction which featured Wellman custom-built buckets for extra heavy steel mill service, is now used in all

Wellman-Williams Buckets
FOR LONGER SERVICE WITH LESS MAINTENANCE COST

Built in Multiple Rope, Power Arm, and Power Wheel Types in ⅜ yd. to 16½ yd. capacities.

The Wellman Engineering Company
7023 Central Avenue • Cleveland 4, Ohio
Sales and Service Agencies in Principal Cities

Send for Free Bulletin
Tell us about your particular requirement and we will send full description of construction and features in special bulletins which clearly prove why YOUR NEXT BUCKET SHOULD BE A WELLMAN.

PERFORATED METAL
SAND AND GRAVEL SCREENS
Manufactured exactly to your specifications
Any size or style screen, in thickness of steel wanted with any size perforation desired.
We can promptly duplicate your present screens at lowest prices

CHICAGO PERFORATING CO.
2437 West 24th Place
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the accepted grinding aid for all portland cements.

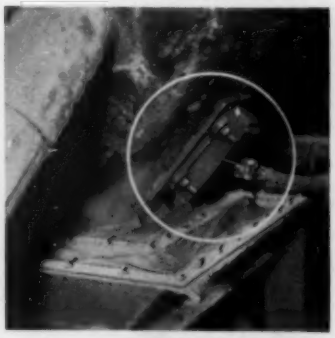
DEWEY AND ALMY CHEMICAL COMPANY
Chicago Cambridge Montreal

SODA ASH
FLOWS EASILY NOW!

• Midwestern cement plant had difficulty keeping free flow of soda ash from bins—until it installed "Branford" Pneumatic Vibrators. Installation view below. There are six "Branfords" in this plant.

No
• ARCHING
• HANGING-UP

BRANFORD PNEUMATIC VIBRATORS



• Keep material handling equipment operating at peak capacities and labor costs down to a minimum by using "BRANFORD" Pneumatic Vibrators on Hoppers, Bins, Chutes, Screens, Concrete Buckets, etc.

Economical in operation and maintenance.
Flow of material regulated by air control valve.
Hundreds in successful use.

Write us on your problem.

NEW HAVEN VIBRATOR CO.
145 CHESTNUT ST. NEW HAVEN 7, CONN.

Left: Jaw crusher followed by rolls and double-deck screen are driven by Diesel engine. Right: Triple-deck sizing screen for gravel moved by belt conveyor from double-deck primary screen. Sand drag shown to the left

Portable Plant for Airport

Sand and gravel plant and concrete batching and mixing unit used on large runway job

IN THE CONSTRUCTION of the runways at Wright Field, Dayton, Ohio, Frank S. Tilliman, engineer-contractor of Milwaukee, Wis., used the type of plant set-up shown in the illustrations.

Operations started July, 1943. A 1¼-cu. yd. Northwest Diesel dragline was used to excavate material and dump into a Lippmann stoker-feeder which feeds it out to a 24-in. conveyor belt, 600-ft. centers. As the excavation proceeded toward the screening and crushing plant, the belt was shortened. This belt dumped to another feeder of the same type which was followed by a second 24-in. belt conveyor, 30-ft. centers, inclining up to a 4- x 6-ft. double-deck, Lippmann vibrating screen where the first separation took place. Plus 1½-in. gravel goes to a 12- x 36-in. jaw crusher and a set of rolls to produce minus ¾-in. gravel. Crushed material joins the screen troughs on a 24-in. conveyor belt, 40-ft. centers, inclining up to the Lippmann rotating washer and a triple-deck vibrating screen. A Caterpillar-Diesel engine supplies the power to operate conveyor belts, screens, jaw crusher and rolls.

Dragline excavates material and dumps into stoker type feeder

The triple-deck screen following the washer has 7/8-in., 3/8-in., and 1/4-in. screen decks. This screen is followed by another washer and a double sand drag, the desired fine sand being carried away by 15-ft. stockpiling conveyor. The coarser sand rejected is loaded into trucks with a ⅜-cu. yd. Link-Belt Speeder clam shell, and is carried back to the lake and dumped. The other desired sizes from the washer are chuted into stockpiles on each side and stockpiled by a 1½-cu. yd. Northwest Diesel clam shell.

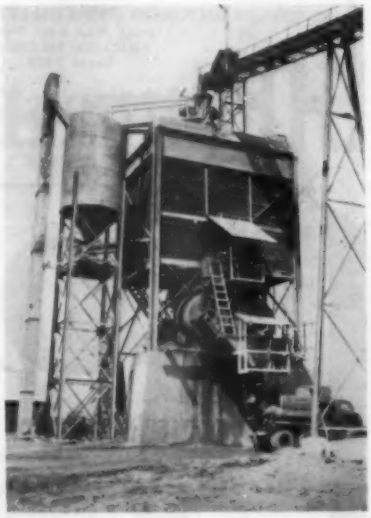
This shovel also fills a three-compartment, 40-cu. yd. Butler hopper which in turn feeds to a 24-in. belt conveyor, 225-ft. centers, inclining up 67 ft. to a three-compartment, 350-ton bin above the two 2-cu. yd. Ransome mixers which are supported on concrete piers. Screw conveyors and a bucket elevator carry bulk cement up to the top of a 200-bbl. silo. Another screw conveyor at the bottom of the silo takes the cement to the weighing bin in the batcher plant. Cement, sand, and gravel are weighed out on Butler scales but the water from city mains is controlled by volume. To haul concrete to the airport runway site, 4-cu. yd. Rex high-lift agitators, on Ford and Chevrolet chassis, are employed.

Silica Plant

SILICA PRODUCTS OF OREGON, LTD., Portland, Ore., has received the approval of the Defense Plant Corporation for the erection of a silica sand treating plant at Eugene, Ore. It is said that the plant will cost $75,000.

Oxy-Acetylene Handbook

AN authoritative textbook on basic oxy-acetylene welding and cutting procedures has recently been published by The Linde Air Products Co., New York, N. Y. It is a 600-page manual for self-instruction and also for use as a standard classroom textbook in vocational and trade schools, technical high schools, and engineering colleges.



Two mixers are supported on concrete piers. Plant bins are above, and cement is in separate silo, to the left

Ballast Specifications

(Continued from page 62)

(c) Gravel for prepared ballast shall conform to one of the following sets of requirements for grading, depending upon the percentage of crushed particles specified:

Size No.	Percent Crushed Particles	Amounts Finer Than Each Sieve (Square Opening Laboratory Sieves), Percents by Weight							
		1½"	1"	½"	No. 4	No. 8	No. 16	No. 50	No. 100
G-1	0-20	100	80-100	50-85	20-40	15-35	5-25	0-10	0-2
G-2	21-40	100	65-100	35-75	10-35	0-10	0-5	..	..
G-3	41-100	100	60-95	25-50	0-15	0-5	..	..	..

Note: Size numbers and gradations in size adopted from National Bureau of Standards Simplified Practice Recommendation R-163-39.

(d) The percentage of crushed particles in gravel shall be determined on a representative sample, weighing not less than 10 lbs., of the material coarser than the No. 4 sieve. Particles having one or more faces resulting from fracture shall be considered as crushed particles. The percentage by weight of crushed particles in the material coarser than the No. 4 sieve shall be considered as the percentage of crushed particles in the sample.

Handling:

Prepared ballast shall be handled at the producing plant in such a manner that it is kept clean and free from segregation. It shall be loaded only into cars which are in good order, tight enough to prevent leakage and waste of material, and which are clean and free from rubbish or any substance which would foul or damage the ballast.

Inspection

If material loaded, or being loaded, does not conform with these specifications, the inspector shall notify the contractor to stop further loading until the fault has been corrected and to dispose of all defective material without cost to the railroad.

Testing:

(a) Determinations of deleterious substances, resistance to abrasion and soundness shall be made at a testing laboratory selected by the purchaser, but visual inspection and gradation tests shall be made at the place of production prior to shipment as often as considered necessary.

(b) Samples of the finished product for gradation and other required tests shall be taken from each 200 tons of prepared ballast, unless otherwise ordered by the Engineer. The sample shall be representative and shall weigh not less than 100 lbs.

Methods of Test:

(a) Samples shall be secured in accordance with the current Methods of Sampling Stone, Slag, Gravel, Sand, and Stone Block for Use as Highway Materials, A.S.T.M. Designation D75.

(b) Sieve analysis shall be made in accordance with current Method of Test for Sieve Analysis for Fine and Coarse Aggregates, A.S.T.M. Designation C 136.

(c) Material finer than the No. 200 sieve shall be determined in accordance with the current Method of Test for Amount of Material Finer than No. 200 Sieve in Aggregate, A.S.T.M. Designation C117.

(d) The percentage of soft and friable particles shall be determined in accordance with the Method of Test for Quality of Soft Pebbles in Gravel, A.A.S.H.O., Method T-8, in the 1938 edition of Standard Specifications for Highway Materials and Methods of Testing & Sampling.

(e) The percentage of clay lumps shall be determined in accordance with the current Method of Test for Clay Lumps in Aggregates, A.S.T.M. Designation C 142.

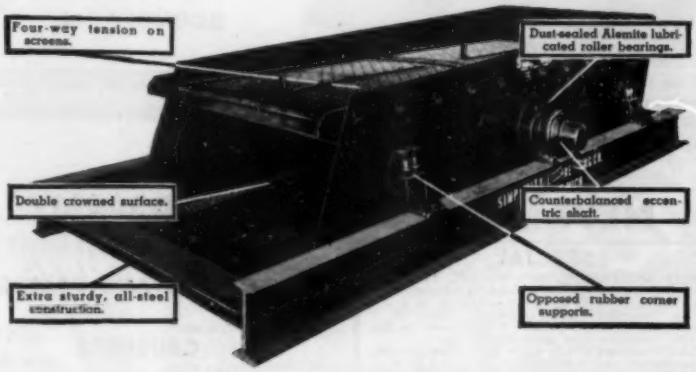
(f) The resistance to abrasion shall be determined in accordance with

CLEANER MATERIALS MORE ACCURATE SIZING

—SAY CUSTOMERS OF LARGE WESTERN FIRM USING *Simplicity* SCREENS

Recently the head of a large Aggregate Producing company in the West made this statement.—"I've always understood that Simplicity Gyrating Screens were good, but I didn't realize how good they are until after I installed that 4'x 10' triple deck screen in one of my plants. No other screen is one, two, three, when compared to a Simplicity. Hardly a day goes by without some one of my customers making some comment about how perfectly sized and cleaned my material now is. From now on its Simplicity screens for me—the best aggregate screen on the market."

You, too, can insure better cleaned, more accurately sized aggregates by installing a Simplicity Gyrating Screen. Write today for complete facts and prices.



Simplicity

ENGINEERING COMPANY · DURAND MICH.

the current Method of Test for Abrasion of Coarse Aggregates by Use of the Los Angeles Machine, A.S.T.M. Designation C 131, using the standard grading most nearly representative of the size of ballast specified.

(g) Soundness tests shall be made in accordance with the current Method of Test for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate, A.S.T.M. Designation C 88.

(h) The weight per cubic foot shall be determined in accordance with the current Method of Test for Unit Weight of Aggregates, A.S.T.M. Designation C 29.

Measurement:

(a) When ballast is paid for by the ton each car shall be weighed if that is practicable. If it is impracticable to weigh each car the weight of per cubic yard shall be obtained by weighing at such intervals as may be ordered by the Engineer, not less than five cars loaded with ballast, the contents of which have been carefully measured. The weight per cubic yard obtained by such a test shall be used in calculating the weight per car until additional tests are made.

(b) When ballast is paid for by the cubic yard the quantity shall be determined, when practicable, by applying the weight per cubic yard as determined in (a) above. When impracticable to determine the weight per cubic yard the contents of each car shall be carefully estimated by comparison with cars the contents of which have been accurately measured.

TABLE 3—SUMMARY OF SPECIF ICATIONS FOR SLAG BALLAST

Railroad No.	General	Requirements: Grading	Conforms in Principle to Grading No.
2	None	Crusher run 2½ in. down	None
3	None	0—2½; ¼—1½ and ½—1¼ in.	Last two are No. 5
9	None	No. 4—1½ in.	No. 5
12	AREA	AREA	AREA
16	None	Passing 3-in. rd. with fines screened out	No. 24
22	Free from dirt, dust, loam or rubbish	Passing 3 in. rd.	None
25	Air-cooled blast furnace slag free from dust	¾—2½ in. and ¾—1½ in.	No. 24 and No. 4
34	Comprehensive specification for slag same as for stone which appears to be based on AREA recommendations current in 1934		
42	Uniform in density in quality; weight at least 70 lb.	1½—2¾ in. rd.	No. 24
43	Uniform in density in quality; weight at least 70 lb.	1½—2¾ in. rd.	No. 24
45	To weigh approximately 2200 lb. per cu. yd.	4—1½ in.	No. 5 or No. 57

The committee also recommends that the following Standard Method of Test for Quality of Soft Pebbles in Gravel be published in the A.R.E.A. Manual:

This method was standardized by the American Association of State Highway Officials in 1924. It was withdrawn in 1940 because of the feeling that, although correct in principle, it is not sufficiently severe. Nevertheless, no substitute method has been developed and it is con-

(Continued on page 104)

From the SMALLEST to the LARGEST TONNAGES

TYLER-NIAGARA SCREENS

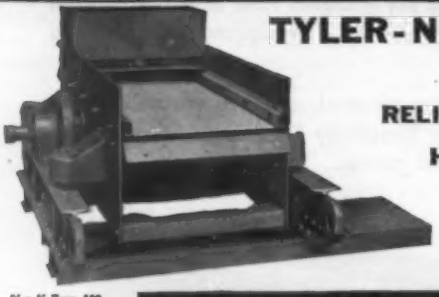
are

RELIABLE

HIGH CAPACITY

EFFICIENT

ECONOMICAL



2' x 4' Type 100 Tyler-Niagara Screen

6' x 14' Type 900 Tyler-Niagara Screen

THE W. S. TYLER COMPANY, Cleveland 14, Ohio

We Own and Offer

NEW AND USED EQUIPMENT

SPECIAL

DIESEL GENERATOR SET—300 HP, Fairbanks-Morse Diesel, 6 cylinder, Model 32 complete with auxiliaries, 257 RPM, direct connected to a 250 KVA Fairbanks-Morse Generator, Type D, 3 phase, 60 cycle, 2300 volts. V-Belt Drive to Exciter. Complete with panel boards, etc.
ROTARY CONVERTER—1000 KW Westinghouse. Transformer and auxiliaries.
TURBINE—100 HP Westinghouse 2700 RPM gear reduction. 3-1.
AIR COMPRESSOR—I. R. Duplex, 100 HP, motor and receiver. Capacity 582'.
STEEL GUY DERRICK—110' mast, 90' boom—3 drum Clyde hoist, electric.

CRANES AND SHOVELS

1—P&H 1 yd. **SHOVEL**, gasoline. Reconditioned.
1—Marion 32 steam, 1⅛ yd. **SHOVEL**.
1—**LOCOMOTIVE**, 4-wheel, 10 ton, 25' boom. Brown Hoist Co.
1—**OVERHEAD**, 10 ton, 74' 4" span, air operated.

CONVEYORS AND ELEVATORS

Various sizes.

DRILLING EQUIPMENT

1—No. 40 I. R. Drill sharpener.

COOLERS AND DRYERS

1—3½x40 ft.
1—7'x56'.
1—10x90 ft., and others.

CRUSHERS

All types, various sizes.

FEEDERS

2—**BAILEY FEEDERS**, Type No. 3, complete with steel hoppers, 8½ ft. dia. x 12 ft. cone bottom.

TANKS

Up to 55,000 bbls.

GRINDING EQUIPMENT

5½x20 ft. **TUBE MILLS** F. L. Smidth Co.
5x22 ft. **TUBE MILL.**
5x16 ft. **TUBE OR BALL MILL.**
2—4-roll **RAYMOND MILLS.**

KILNS

Vulcan 7'x120', like new. And other sizes.
1—8x9½x180 ft. And others.

SCREENS

4—**SINGLE DECK HUMMER SCREENS**, 4'x5' complete with feeder and generator.
2—**SINGLE DECK HUMMER SCREENS**, 4'x5'. And other types and sizes.

ELECTRIC MOTORS

Large stock, rebuilt, AC or DC.

SYNCHRONOUS MOTORS

1—1900 HP, 25 cycle, 2300 V.
2—1250 HP, 25 cycle, 2300 V.

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WEBBER EQUIPMENT CO.

New and Used Equipment

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Financial

RECENT DIVIDENDS

Alpha Portland Cement Co.	.25	Sept. 25
Arundel Corp.	.25	July 1
Calaveras Cement Co. 7% pfd. (p100) (arrears)	.75	June 15
Canada Cement Co., Ltd. 6½% pfd.	1.25	June 20
Canada Crushed Stone, Ltd.	.10	June 20
Eastern Magnesia Talc Co. Com. (p100)	1.00 ext.	June 30
International Minerals & Chem. Co.	.50	
International Minerals & Chem. Co. 4%	1.00	
Lehigh Portland Cement Co.	.25	Aug. 1
Lehigh Portland Cement Co. pfd.	1.00	Oct. 2
Lone Star Cement Co.	.37½	June 30
Missouri Portland Cement Co. Com. (p25)	.25	June 30
Northwestern States Portland Cement Co. Com. (np)	.25	July 1
Ohio River Sand Co. 7% pfd. (p100) (arrears)	$1.00	June 1
Superior Portland Cement Co. Cl. A	.82½	July 1

•

PEERLESS CEMENT CORPORATION, Detroit, Mich., had a net loss of $40,172 for the three months ended March 31, 1944, as compared with a net loss of $10,290 for first quarter in 1943.

ARUNDEL CORPORATION, Baltimore, Md., showed a net profit of $170,766, before Federal and state income taxes, for the five months ended May 31, 1944. For the five months ended May 31, 1943, the net profit was $782,516.

•

ALPHA PORTLAND CEMENT CO., Easton, Penn., presented the following earnings statement for the 12 months ended March 31:

	1944	1943
Net sales	$5,686,445	$10,716,284
Operating expenses	5,095,483	7,659,618
Deprec. & depletion	682,201	976,100
Operating income	d 91,238	2,080,566
Profit secur. sold	3,114	.....
Other income	88,358	81,672
Total income	233	2,162,237
Income charges	62,957	33,664
*Federal income tax	83,583	838,928
Contingency reserve	.....	200,000
Net profit	d 146,307	1,089,646
Dividends	591,356	940,452
Surplus for period	d 737,663	149,194

*No liability incurred for excess profits tax.

•

SOUTHERN PHOSPHATE CORPORATION, Baltimore, Md., had a net operating profit of $199,474 for the year ended December 31, 1943. This compares with a profit of $155,765 for 1942. Net sales were $1,350,228 in 1943 as against $1,527,634 in 1942.

YOSEMITE PORTLAND CEMENT CORPORATION, San Francisco, Calif., has announced that the directors of the company have been sanctioned by the stockholders to sell the Merced, Calif., plant facilities and liquidate the company. About 80 percent of the outstanding shares voted for sale of the plant to Henry J. Kaiser Co. As previously mentioned in ROCK PRODUCTS the plant will be set up in Venezuela.

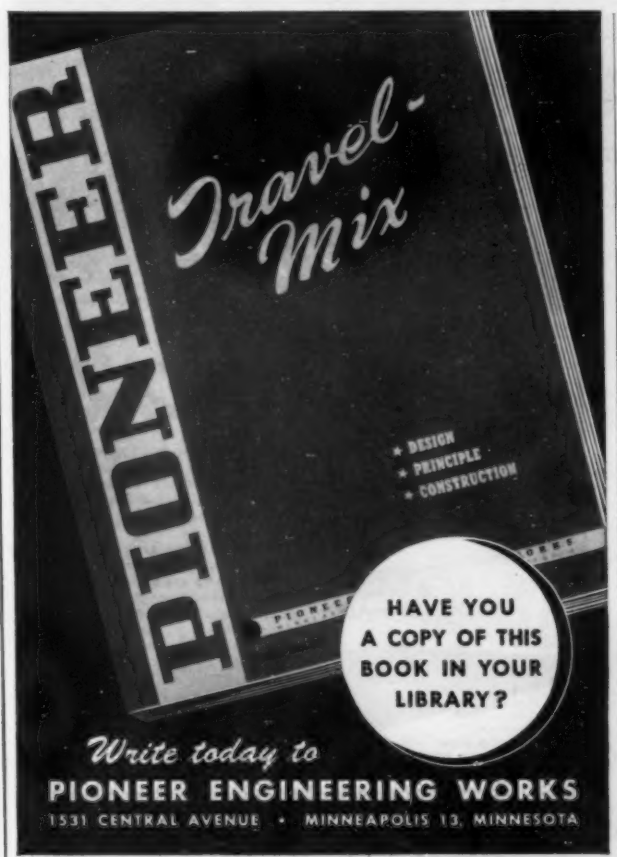
•

MICHIGAN SILICA CO., Rockwood, Mich., presented the following income account for the years ended December 31:

	*1943	1942
Net sales	$252,490	$269,864
Cost of sales	175,594	181,527
Selling, etc., expense	42,153	41,944
Operating profit	34,743	46,393
Other income	1,435	2,287
Total income	36,178	48,680
Deductions	2,521	3,636
Income and profits tax	12,166	18,201
Net income	21,491	26,843
Dividends	28,000	28,000
Deficit for year	6,509	1,157
Earned surplus, 1-1	16,090	17,431
Surplus debits	4,469	184
Earned surplus, 12-31	5,112	16,090
Earned per share	$0.15	$0.19
Number of shares	140,000	140,000

*From SEC report.

(Continued on page 102)



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MILD CARBON ELECTRODES
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STEELS
SERVICE
Our stocks and the convenient location of our warehouses—in the leading production centers—have enabled us to give especially good service on welding supplies.
Quick delivery, also, on Welding Machines, Protect-O-Metal for the elimination of weld spatter, and Havens "C" Protected Clamps. Your inquiries will receive prompt, courteous attention—phone, write or wire our warehouse nearest you.
UNITED STATES STEEL SUPPLY COMPANY
CHICAGO (90) · BALTIMORE (3) · BOSTON (34)
CLEVELAND (14) · MILWAUKEE (1) · NEWARK (1), N. J.
PITTSBURGH (12) · ST. LOUIS (3) · TWIN CITY-St. Paul (4)
UNITED STATES STEEL

FLORIDA PORTLAND CEMENT CO., Chicago, Ill., with plant at Tampa, Fla., had a net profit of $88,192 for the three months ended March 31, 1944, which compares with $130,937 for a like period in 1943. Net sales in the first quarter of this year were $605,615 as compared with $910,348 for the first quarter in 1943. Net profit for the calendar year of 1943 was $292,678 as against $327,197 for the year 1942.

•

CALAVERAS CEMENT CO., San Francisco, Calif., showed a net income of $169,132 for the year ended December 31, 1943. This compares with $226,939 for the year ended December 31, 1942. Net sales in 1943 were $1,807,420 as against $1,845,122 in 1942.

•

CONSOLIDATED ROCK PRODUCTS CO., Los Angeles, Calif., has reported a net profit of $269,232 for the year ended December 31, 1943, after all charges, including provision of $29,636 for federal income taxes and charges of $299,551 for interest on defaulted bond interest and amortization of bond discount and expense.

The company is now being reorganized under a plan which will provide for a simplified stock structure with only two classes of securities outstanding: 12,944,000 of new first mortgage bonds and approximately 3,197,000 shares of common stock, $1 par value. Sales for 1943 totaled $6,027,632.

•

CONSOLIDATED CEMENT CORPORATION, Chicago, Ill., reported a net loss of $130,590 for the three months ended March 31, 1944, which compares with a net profit of $45,753 for the first quarter in 1943. Net sales for the first three months in 1944 were $304,082 as against $494,991 for the first three months in 1943.

SUPER-ABILITY of the Versatile DUCK

Like the amazing duck that performs on land or water Owen Dredging Buckets are designed to withstand the special difficulties of under water service or the most severe kind of digging on land. Protection of bearings against water and grit is a feature. Write for literature.

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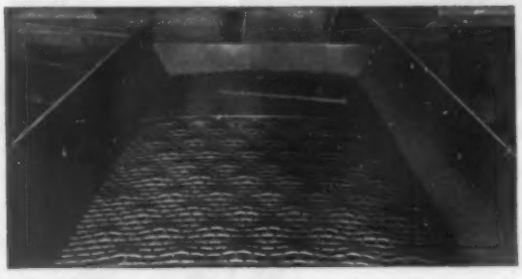
6040 BREAKWATER AVE., CLEVELAND, O.
BRANCHES: New York, Philadelphia, Chicago, Berkeley, Cal.

OWEN BUCKETS
A MOUTHFUL AT EVERY BITE

More EFFICIENT Screening



The natural tendency of material on a sloping surface is to travel in a straight line. This results in an efficiency loss that can be counteracted effectively through the use of perforated plate with either staggered perforations or corrugations, or both.

Hendrick Perforated Plate can be supplied with any size, any shape perforations. Light gauge or heavy plate in all commercially rolled metals. Flat or rolled to any curvature; single or double corrugated. Write for details.

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Makers of Elevator Buckets of all types. Mitco Open Steel Flooring. Mitco Shur-Rite Treads and Mitco Armorgrids. Light and Heavy Steel Plate Construction.

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INDUSTRIAL GEAR MFG. CO.
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CONSOLIDATED CEMENT CORPORATION, Chicago, Ill., had a net profit of $54,003 for the year ended December 31, 1943, after taxes and other charges. This compares with $333,697 for the year ended December 31, 1942. Net sales in 1943 were $2,297,247 as compared with $3,291,199 in 1942.

•

DIAMOND PORTLAND CEMENT CO., Middlebranch, Ohio, reported the following income account for the years ended December 31:

	1943	1942
Gross profit	$174,206	$333,403
Expenses, etc.	159,925	193,252
[1]Oper. profit	14,281	140,151
Other income	8,345	9,212
Total income	22,626	149,363
Other deductions	.....	1,759
Contingency res.	15,000	15,000
Fed. income tax	5,000	58,000
Excess prof.. tax	.....	[2]20,700
Pr. yr. inc. tax	2,226	.....
Pr. yr. tax claim	[3]cr 17,500	.....
Net income	17,900	63,904
Dividends	14,400	46,800
Surplus for year	3,500	17,104
Earn. surplus, 1-1	523,721	506,617
Earn, surp., 12-31	527,221	523,721
Earned per share	$0.25	$0.89
No. of shares	72,000	72,000

[1] After depreciation and depletion: 1943, $35,663; 1942, $38,794.

[2] After deducting $2,300 post-war refund.

[3] Refundable portion of Federal taxes on income of prior years resulting from carryback of excess profits tax credit.

•

AMERICAN AGGREGATES CORPORATION, Greenville, Ohio, presented the following income account for the years ended December 31:

	1943	1942
Net sales	$2,446,474	$3,308,478
Cost of sales	1,595,529	1,955,600
Selling, etc., exp.	223,793	281,885
Deprec. & deplet.	244,426	252,793
Operating profit	382,726	818,200
Allied oper. inc.	156,964	170,487
Other income, net	51,367	105,928
Total income	591,057	1,094,615
Emerg. facil. amor.	74,737	[1]302,064
Fed. income tax	289,600	521,000
Net income	226,719	271,551
Preferred divs.	57,750	57,750
Common divs.	93,763	93,763
Surplus for year	75,206	120,038
Earn. surp., 1-1	789,214	569,176
Fed. inc. tax res.	cr 100,000	cr 100,000
Earn. surp., 12-31	964,420	789,214
Earn., pfd. share	$19.63	$23.51
Earn., com. share	0.90	1.14
No. of pfd. shares	11,550	11,550
No. of com. shares	187,626	187,626

[1] Includes loss on sale of permanent assets, etc.

•

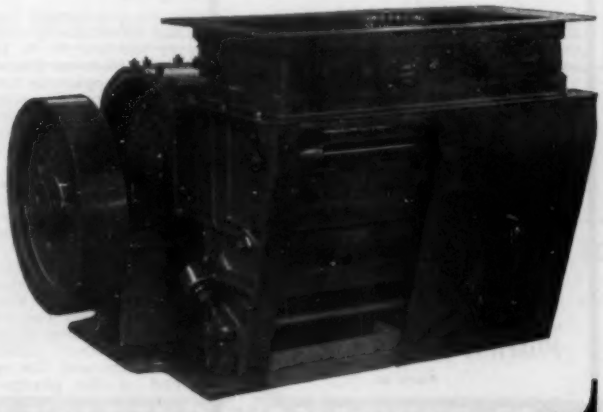
WARNER CO., Philadelphia, Penn., showed the following income account for the years ended December 31:

	1943	1942
Net sales	$8,882,114	$10,313,935
Cost of sales	6,405,224	7,231,535
Depreciation & depletion	338,753	386,722
Selling expense	222,643	282,749
Admin. expense	446,968	377,052
Operating profit	1,468,526	2,035,877
Secur. income	29,144	36,654
Rental inc., net	143,727	.....
Total income	1,641,397	2,072,531
Income chgs., net	46,984	104,488
Balance	1,594,413	1,968,043
Bond int., etc.	270,261	291,264
Bond disc. & exp.	11,874	32,079
Income taxes	448,500	651,200
Excess prof. tax	135,000	22,000
Debt retire. cred.	cr 13,500	cr 2,200
Prov. for conting.	75,000	90,000
Net profit	667,279	883,701

DEPENDABLE, UNINTERRUPTED SERVICE COUNTS . . . . .

AMERICAN CRUSHERS are built to give trouble-free, long-lasting service . . . to produce more volume and more variety at lower operating cost. Manganese steel rings or hammers strike the stone in suspension and shatter and distribute it before it reaches the breaker and grinding plates. A heavy alloy steel shaft gives them their powerful drive and SKF spherical roller bearings assure their smooth performance.

Write today for detailed information

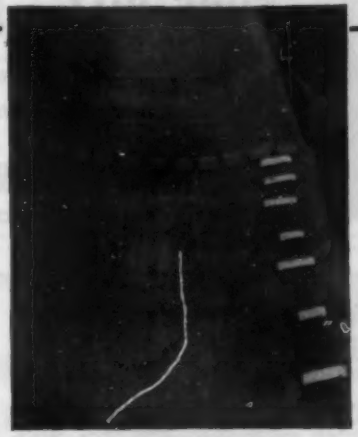


AMERICAN PULVERIZER CO.
1245 MACKLIND AVE. • ST. LOUIS 10, MO.

TALCOTT BELT FASTENERS

The Handiest Fastener Made

for **SPLICING ..AND.. PATCHING Conveyor Elevator and Transmission Belts**



Only a hammer is needed to apply Talcott Fasteners.

Conveyor views of one of many plants that has standardized on Talcott Fasteners for their conveyor belting.

1 TALCOTT CONVEYOR BELT FASTENERS—Made in short sections which allow the belt its full pliability so it will readily conform to the trough idlers and also will run smoothly under trippers, scrapers and on tandem drives.

2 TALCOTT'S ACME STEEL PATCH FASTENERS—Don't discard a good belt because it has been torn by accident. Patch it with Talcott Acme Patch Fasteners and obtain the full value out of your belting. Patches are easily and quickly made.

3 TALCOTT CLINCHING FASTENERS—For all heavy transmission and elevator belting. Backs of fasteners are made extra strong to withstand most severe strain. The teeth pierce between threads of the warp of the belt, preventing belts from breaking at the joint.

A Fastener for Every Belt

W. O. & M. W. TALCOTT, INC.
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RYERSON STEEL IN STOCK

Call Ryerson when you need steel—any kind, shape, or size. Large stocks are available at ten convenient plants. Ask for a Ryerson Stock List—your guide to quick shipment of steel.

Principal Products Include:

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Plants at:

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Ballast Specifications

(Continued from page 100)

tinued as a standard for ballast until a better method has been adopted.

Standard Method of Test for Quality of Soft Pebbles in Gravel Method T-8-24

1. Method consists in determining the resistance of the pebbles to uniform static pressure.†

2. A sample of at least 1,000 grams shall be separated into three sizes and subjected to uniform pressure without impact, as follows:

	Pounds
0.185 in. to 0.375 in.....	35
0.375 in. to 0.750 in.....	60
0.750 in. to maximum size..	75

3. Pebbles crushing under these loads shall be classified as soft pebbles, and shall be reported as a percentage of the original sample by weight.

4. Disintegrated rocks, or other rocks, which will obviously break up into fine material during the screening or mixing operations, shall not be considered in this test.

†A satisfactory instrument for classfying soft stone by this method was devised by the late W. H. Douglass, of the Iowa State Highway Commission. A description of this apparatus follows:

The Douglass stone meter consists of a jack acting through the specimen to compress a calibrated spring. The jack, which is of the rack-and-pinion type, is located in the base of the machine and is actuated by means of a hand lever attached to the shaft of the pinion. To the base are attached two vertical standards which are attached to each other by two cross members, one at the top and one near the center. The soil compression spring is located between these two cross members. The top of the spring bears against the top cross bar and the bottom against a collar on the movable plunger which passes through both cross members and the spring. To the lower end of the plunger is screwed a mechanic's jack which allows adjustment for the various sizes of stones and also carries a ball and socket head. The top end of the plunger is graduated to read the desired pressures as it passes through the top cross member.

Chats for Ballast

No recommendation was made by the subcommittee for a specification covering chats for ballast. It was considered impracticable to write specifications as the sizes used depend almost altogether on the local sources. Sizes of material from the various sources differ so much that any single specification probably would find little use.

Use of Asphalt in Ballast

Another subcommittee headed by C. P. Nicholson as chairman has been investigating the use of asphalt in ballast. Two railroads have test sections, the New York Central and the Illinois Central. No definite conclusions have been drawn or recommendations made by the committee, but preliminary results seem to be

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SURE BILL—BUY 'CLEVELAND'-WE DO!"

Tough, Durable, Accurate Wire Screens for Vibrators or Rotary Jackets

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CRUSHERS

Single and double roll and jaw crushers, hammer mills, super dry pans—steel log washers and scrubbers, sand drags, revolving and vibrating screens, elevators, conveyors, dryers, jigs, hoists.

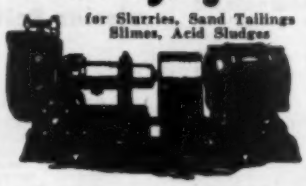
SCREENS

Complete portable, semi-portable and stationary crushing, screening, and washing plants for different capacities of any materials.

McLanahan & Stone Corp. Established 1835 HOLLIDAYSBURG, PENNSYLVANIA

WILFLEY
centrifugal SAND PUMPS

for Slurries, Sand Tailings Blimes, Acid Sludges



Save Pumping Cost

Continuous operation without attention for long periods. Stuffing box, stuffing, gland water ALL eliminated. Close clearances maintained by easy slippage seal adjustment. Heavy pumping parts of material best suited for YOUR particular problem. Complete engineering service. Prompt shipment of parts. The most efficient and economical pump you can buy. *Write for Complete Catalog.*

A. R. WILFLEY & SONS, Inc. Denver, Colo., U. S. A.

NEW YORK OFFICE: 1775 BROADWAY

very satisfactory. In both cases an asphalt-coated stone ballast is used. In the case of the New York Central test section, it is reported that only a few cracks had developed in the surface of the seal, and along edges of the cross ties after a year of service. Track has remained in good line and surface and the coated ballast sheds water readily.

Specifications for Riprap

Riprap specifications were covered in a progress report by another subcommittee headed by L. H. Roden, chairman. As quite a number of producers have been furnishing riprap to railroads, the recommended specifications are given herewith:

All stone for riprap shall be dense, sound and hard, and of a quality that will withstand the action of water, frost or other weathering. It shall be durable under exposure to any acid-bearing waters found at or near the work site.

Classification:

Stone for riprap may be irregular in shape and shall be classified as follows:

(a) *Class A.*—Each stone shall weigh not less than 20 lbs, nor more than 140 lbs. and at least 50 percent of the stones must weigh more than 50 lbs. each. No dimension shall be less than 4 in.

(b) *Class B.*—Each stone shall weigh not less than 50 lbs. nor more than 150 lbs. and at least 50 percent of the stones must weigh more than 100 lbs. No dimension shall be less than 6 in.

(c) *Class C.*—Each stone shall weigh not less than 140 lbs, nor more than 450 lbs. and at least 50 percent of the stones must weigh more than 200 lbs. each. No dimension shall be less than 8 in.

Inspection:

All material shall be subject to inspection by an authorized company representative at the point of production.

Measurement:

(a) Riprap shall be paid for by the ton or cubic yard, as specified in the contract. The weight per cubic yard shall be determined by weighing at such intervals as may be ordered by the Engineer, not less than five cars loaded with riprap, the contents of which have been carefully measured. The weight per cubic yard or cubic yards per car thus determined shall be used as the basis of payment until additional tests are made.

Move Warehouse

PIONEER SAND & GRAVEL CO., Seattle, Wash., has plans drawn up to move its warehouse from 2501 Northlake avenue to 901 Fairview avenue. A new concrete foundation has been built for the structure.

PULVERIZERS for the reduction of Cement Materials, Limestone, **Agricultural Limestone,** Fire Clay and All Dry, Refractory Materials.

Capacities: 1 to 60 tons per hour **Finenesses: 20 to 350 mesh**

BRADLEY PULVERIZER CO.

ALLENTOWN, PENNA.

To Increase Capacities or Fineness of Present Grinding Plant—
To Reduce Power and Maintenance Costs—
To Insure an Absolutely Uniform Product—

***Use the* BRADLEY AIR SEPARATOR**

NEW *. . . for still greater capacity in producing Agstone and the finer Aggregates—at low cost*

NEW HOLLAND MODEL 30

- Adjustable swinging hammers with renewable multi-point hammer tips.
- Welded steel plate construction
- Adjustable breaker plate.
- Tramp iron pocket.
- Heavy duty roller bearings.
- And other features.

Write Industrial Division for complete details about the new Model 30 and the complete line of New Holland hammer and roll crushers.

NEW HOLLAND NH MACHINE CO.

NEW HOLLAND PENNSYLVANIA

Alpha products

Screw Conveyors Any Size and Gauge. Welded Elevator Buckets All Sizes, Storage Bins, Bin Gates Special Designs, Tanks, Pressure and Storage, Plate and Sheet Metal Specialties of Steel, Copper, Stainless Steel, and Aluminum.

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ERIE PORTABLE AggreMeters

36-YARD
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AggreMeters · Buckets · Concrete Plants · Traveling Cranes

OBITUARIES

EDWARD NEEDLES TRUMP, chief engineer of the Solvay Process Co., Syracuse, N. Y., for 50 years, and one of the pioneers of the concern, died June 21. He was 86 years old. A native of Philadelphia, Mr. Trump started his career as operator of a beet sugar plant in Delaware. In 1893 he became chief engineer and general manager of the Solvay Process Co. In 1913 he was elected vice-president, but in 1921 he turned over these duties to others. He also was consulting engineer to the Warner Company and other corporations. Mr. Trump was a director of the Direct Separator Co., a member of the American Society of Mechanical Engineers and a member of the American Institute of Chemical Engineers.

•

LESLIE ROTH HARRISON, JR., a civil engineer for the Magnet Cove Barium Corp., Houston, Texas, was killed in the crash of a Naval plane near Rio de Janeiro. He had recently transferred from the corporation's offices at Malvern, Ark., where he was general manager. Mr. Harrison was born in Denver, Colo., on August 22, 1915, and graduated from the Colorado School of Mines in 1938 as a metallurgical engineer. His first job was with the American Agricultural Chemical Co., Pierce, Fla. Before leaving the company he was in charge of the phosphate rock flotation plant. He then became research metallurgist for the Phosphate Recovery Corp., Mulberry, Fla., working in the laboratory testing various nonmetallic ores and equipment.

•

PAUL HOFFMAN, consulting engineer for the Ingersoll-Rand Co., Phillipsburg, N. J., died recently at the age of 61. He was born in France and attended the Polytechnieum, Zurich, from which he graduated in 1904 with the degree of mechanical engineer.

•

FRED FREEMAN of the Diamond Iron Works, Inc., Minneapolis, Minn., died June 1 after being stricken with acute appendicitis while on a job in Wisconsin. Mr. Freeman had been with the company for more than 30 years and was one of the best known crusher men in the country.

•

C. K. ORDWAY, district manager for Pioneer Engineering Works, Minneapolis, Minn., died May 27. He was 51 years old.

•

CHARLES S. LINCOLN, chief design engineer of the crushing, cement and mining machinery division of the basic industries department of Allis-Chalmers Mfg. Co., Milwaukee, Wis., died May 24 at the age of 59. He had been with the Allis-Chalmers organization for 39 years.

•

GLENN NELSON SITTERLY, president, Western Sand and Gravel Co., Spring Valley, Ill., died recently at the age of 46. Mr. Sitterly was a member of the Lafayette Escadrille of the French Air Force in World War I and destroyed three German planes. He is survived by his widow, two daughters, and a son.

•

JOSEPH MCCLINTOCK GARRIS, manager of the sling division, MacWhyte Co., Kenosha, Wis., passed away recently at the age of 72. He had been with the company since 1931. His son, Erwin F. Garris, who has been his assistant, will succeed him.

Manufacturers' News

American Chain & Cable Co., Inc., Bridgeport, Conn., has appointed Frank W. Bemis sales manager of the American Cable and Hazard Wire Rope Divisions, with headquarters at 230 Park Ave., New York, N. Y. Mr. Bemis has been with the company since 1938.

Wickwire Spencer Steel Co., New York, N. Y., has promoted R. T. Dunlap to the position of vice-president in charge of production, and A. G. Bussmann to the position of assistant to the president. Mr. Dunlap was previously vice-president and general superintendent of the Buffalo district. Before joining Wickwire Spencer in 1943, he was general works manager

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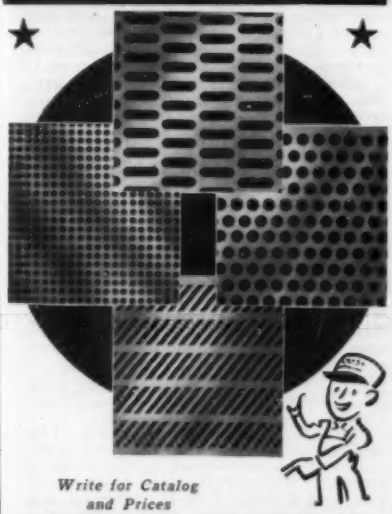

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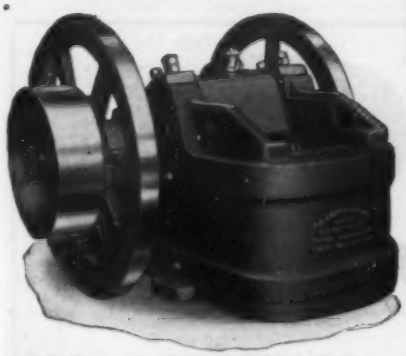

EARLE C. BACON, Inc.

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of the Vulcan Iron Works at Wilkes-Barre, Penn. Mr. Bussmann previously has been the assistant to the executive vice-president. He has been associated with the company since 1930.

Robins Conveyors, Inc., Passaic, N. J., has announced the return of Major Maurice B. Bradley to the sales department, having completed the work which called him into active service with the Army.

American Chain Ladder Co., Inc., New York, N. Y., announces the appointment of Eric Morrell as assistant to Noel L. Dahlander, president of the company.

Caterpillar Tractor Co., Peoria, Ill., announces that William Blackie, controller, and William J. McBrian, treasurer, have been made vice-presidents, and Edward W. Jackson has been made general parts manager. His advancement to this position fills a vacancy created several months ago when L. G. Morgan resigned to move to California and become head of parts department activities on the Pacific Coast. William H. Franklin will succeed Mr. Blackie as controller.

William J. McBrian

William Blackie

The Marion Steam Shovel Co., Marion, Ohio, has announced the election of J. M. Strelitz as chairman of the board and the appointment of C. P. LaMarche as president and general manager. Mr. Strelitz has been a director of the company since 1931 and its general counsel for the past 20 years. Mr. LaMarche has served the company as a director since 1939.

Willamette Hyster Co., Peoria, Ill., announces the appointment of Frank L. Ross, manager of the Eastern Division, as a vice-president and member of the board of directors. Mr. Ross will maintain his headquarters in Peoria.

The Cleveland Pneumatic Tool Co., Cleveland, Ohio, is marking its 50th anniversary during the month of June, 1944. The company was incorporated in Ohio on May 29, 1894, as the Union Electric Co., but the name was changed to the present one five years later. In 1908 a wholly-owned subsidiary, The Cleveland Rock Drill Co., was organized. October 2, 1908, a Canadian subsidiary, the Canadian Cleveland Drill Company, Ltd., was incorporated, which name was changed September 30, 1912, to Cleveland Pneumatic Tool Co. of Canada, Ltd.

T. L. Smith Co., Milwaukee, Wis., has announced the promotion of H. C. Peters to the position of assistant to the president and vice-president in charge of engineering, research and development. Robert P. Bremner, formerly district manager in Milwaukee for the Petoskey Portland Cement Co., is the new general sales manager.

Nordberg Mfg. Co., Milwaukee, Wis., announces that A. E. Owen, who has been in charge of the sale of Symons cone crushers and screens in Canada, Ohio, Pennsylvania and West Virginia, will now be located permanently at the Toronto office and in addition to Symons cone crushers and screens will have charge of sales of all other Nordberg products in Canada. His present address is Concourse Building, Toronto.

Westinghouse Electric & Mfg. Co., Pittsburgh, Penn., announces that W. C. Marshall, vice-president, has been named a member of the Committee on Wage and Salary Administration of the National Association of Manufacturers.

Made of Acid Open Hearth Steel Wire

Round Strand
Flattened Strand
Preformed
Steel Clad
Non-Rotating

The Service Record of this wire rope continues to make and hold friends.

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The Timken Roller Bearing Co., Canton, Ohio, has organized a subsidiary, The Timken Roller Bearing Co. of South America, to service the millions of Timken bearings now operating in South America. After the war, under the direction of Jules A. Morland, the new firm will handle engineering development of Timken products in the Latin-American countries.

H. K. Porter Co., Inc., Pittsburgh, Penn., and Mt. Vernon, Ill., has announced the appointment of M. D. Bensley as general manager of the three plants which recently became Porter subsidiaries, namely, Mt. Vernon Car Mfg. Co., Wheel Foundry Division of Mt. Vernon Car Mfg. Co., and J. P. Devine Mfg. Co.

Morse Boulger Destructor Co., New York, N. Y., announces the purchase of all assets, patents, rights and other property of Robinson Air-Activated Conveyor Systems owned by E. Gwynn Robinson, the inventor. Engineering and sales of the System will be under the management of E. S. Bishop.

Independent Pneumatic Tool Co., Chicago, Ill., has appointed Edward N. Haas works manager of the Aurora, Ill., plant, succeeding W. H. Brewer who has been named general factory manager. John P. Bank succeeds Mr. Haas as assistant works manager.

United States Rubber Co., New York, N. Y., has named Ernest G. Brown as general manager of mechanical goods, general products and "Lastex" yarn and rubber thread divisions, succeeding Willard H. Cobb, recently elected vice-president and member of the executive committee.

The Bristol Co., Waterbury, Conn., announces the opening of a new branch office in Cleveland, Ohio, located in the Engineer's Building. It also announces the appointment of G. H. Gaites as regional sales supervisor of the Cleveland and Pittsburgh territories, with headquarters in the new Cleveland office, and H. C. Clarke as district manager of the Pittsburgh branch office, where he has been resident sales engineer for many years.

Caterpillar Tractor Co., Peoria, Ill., has announced that additions to the "Caterpillar" line will be made, effective at such future times as military requirements make possible. In addition to Diesel track-type and wheel tractors, motor graders, Diesel engines and electric sets now being made, the new line will consist of a wide range of sizes and types of earth moving machines — bulldozers, scrapers, rippers and cable control units.

Allis-Chalmers Mfg. Co., Milwaukee, Wis., has elected Ernest Mahler, executive vice-president of the Kimberly-Clark Corp., Neenah, Wis., to the board of directors, succeeding R. G. Hutchins, New York, who retired after 31 years of service on the board.

New Incorporations

Madison Sand & Gravel Co., Inc., Madison, Wis., has been organized to engage in the business of mining, quarrying, buying, selling and preparing for market sand, stone, gravel, limestone, etc., with a capital of 600 shares of stock, no par value. Incorporators are Harold M. Ziegler, Harold R. Bearbower, and Hebert Fischer.

Concrete Products Material Co., Lincoln, Neb., has filed articles of incorporation with an authorized capital stock of $200,000. Incorporators are Raymond C. Yant and Richard S. Yant of Omaha, Neb.

The General Mica Mining Co., New Haven, Conn., has been incorporated with a capital of 20 shares at $100 par value. Officers are Dino L. Bertolini, president; Rose C. Bertolini, vice-president; Fausto Bertolini, treasurer; and Dora B. Petrulis, secretary, all of New Haven, Conn.

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• Universals give continuous, trouble-free service without requiring attention. No dead areas. No frictional surfaces, such as ratchets or cams. Powerful vibratory action keeps mesh open and free from blinding on most difficult materials. Eccentric weights, shaft, housings and S. K. F. Self-Aligning Ball Bearings all are 100% oversize and absolutely dust-tight.

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GYRATORY: 42" Gates K. 30" Superior McCully (Like new). 20" Superior McCully. Gates Nos. 12, 10, 9, 8, 7½, 6, 5, 4, 3, 2, 1 (75 avail.) Telsmith Nos. 4, 5, 6, 8C, 9 & 16. Also many Austins, Kennedys and Traylors, many sizes.
JAW TYPE: Traylor 60x84, 48x60, 42x48, 24x72. Superior 54x66 & 24x36. Buchanan 30x42. Farrel 60x42, 30x36, 24x36, 18x36, 12x24. Good Roads 1030. Acme 24x40. Misc. 7x12, 9x16, 8x20, 8x24, 12x24, 9x36, 15x36.
REDUC. TYPE: Kennedy Nos. 25, 37 & 49. Telsmith 3-F & 40. Traylor 36" TZ, 8" 10", 12". Super. McCully 6"x10". Newhouse 5, 7, & 10". Symons Cone & Disc Ty. 2' to 4'.
ROLLS: Allis-C. 12½x12, 36x10, 40x15 54x24 & 72x30. Fairmount 30x60 & Jeffrey 24x24 to 36x54 single roll. Cornish 36x14 & 42x16, Etc.
HAMMERMILLS: Williams No. 1, 2, 3, 4, 8, & 9. Jeffrey 36x18 & 36x42. Day Nos. 20 & 40, Etc.
MILLS: Kennedy Ball 4x6, 5x6 & 5x8. Marcy 8x6 & 10x9. Hardinge 6'x5', 8'x30' & 6'x9'. Misc. Tube Mills 5' & 6'x22'. Sturtevant Ring Roll. Raymonds, Kents, Fuller Lehigh, Etc.
CRUSHING PLANTS: No. 65 Diamond No. 22 Pioneer 8x24, 10x30 Good Roads, 9x40 Austin-Western, 9x36 C.R.

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Width	Ply	Top-Bottom	Covers	Width	Ply	Top-Bottom	Covers
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42"	5	1/8"	1/16"	20"	4	1/8"	1/32"
36"	6	1/8"	1/16"	18"	4	1/8"	1/32"
30"	6	1/8"	1/16"	16"	4	1/8"	1/32"
30"	5	1/8"	1/16"	14"	4	1/16"	1/32"
24"	5	1/8"	1/32"	12"	4	1/16"	1/32"
24"	4	1/8"	1/32"				

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TRANSMISSION BELTING

HEAVY-DUTY FRICTION SURFACE

Width	Ply	Width	Ply	Width	Ply
18"	6	10"	6	6"	5
16"	6	10"	5	5"	5
14"	6	8"	6	4"	5
12"	6	8"	5	4"	4
12"	5	6"	6	3"	4

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1"	50 "	8.00
	25 "	6.25
1¼"	50 "	12.00
	25 "	7.50
	35 "	10.50
	40 "	12.00
1½"	50 "	15.00
	25 "	10.00
	35 "	14.00
	50 "	20.00

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I.D. Size	Length	per Length	Couplings
½"	25 feet	$5.00	$1.50 Pair
	50 "	10.00	1.50 "
¾"	25 "	6.25	2.50 "
	50 "	12.50	2.50 "
1"	25 "	10.00	3.50 "
	50 "	20.00	3.50 "

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1 yd. and ½ yd. Dump Buckets.
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Shovel Attachment for 41-B Bucy-Erie.

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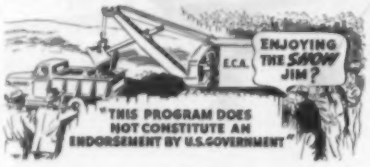

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1—15-ton Bucyrus Erie, coal fired, 40′ boom.

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Portable and stationary, belt with elec. or gas power, sizes from 20 cu. ft. to 1,000 cu. ft.

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1—1¼ yd. Erie gas air Model GA2, Serial No. 9758, with 45′ boom and shovel attachment.

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1—¾ yd. Conco crane, Ser. No. 1304, fully revolving, power 70 H.P. Continental gas engine, 30′ boom.

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1—¾ yd. P & H Model 400 crawler crane Serial No. 4136, with 40′ boom gasoline powered.

1—½ yd. P & H shovel, Model No. 204, Serial No 2303, gasoline powered.

1—½ yd. Northwest No. 2, Serial No. 2908, comb. crane and shovel.

1—¾ yd. Erie Model B2 crawler crane, steam powered, Serial No. 4027, with 50′ boom and shovel attachment.

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1—9x12″ Rogers jaw crusher (Like New).
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1—Acme jaw crusher, Ser. No. 1636 size 9x16″.
1—United Iron Works, "Blake-type" jaw crusher, size 9½x24″.
1—9x12″ Rogers jaw crusher, No. 314. LIKE NEW.
1—10x12″ Colorado Iron Works roll crusher. Laboratory type.
1—Allis Chalmers, No. 5 gyratory crusher, Ser. No. 5331, opening 10x38″.
1—Austin No. 5 gyratory crusher, Ser. No. 2945, opening 12x35½″.

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3—Steel Guy Derricks: 1—20-ton American, steel derrick, 110′ mast, 100′ boom. 1—5-ton Terry Guy Derrick, 70′ mast, 60′ boom; 1—5-ton Insley 75′ mast, 80′ boom. Stiff leg derricks: 1—25-ton Hunter, 40′ mast, 80′ boom; 1—2-ton Pittsburgh, 26′ boom, 15′ mast. Also a number of wood stiff leg derricks, 1 to 5-ton cap.

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85—Electric, ranging from 20 H.P. up to 125 H.P., consisting of triple-drum, double-drum and single-drum, with AC or DC motors, some with attached swingers. Following makes: American, Clyde, Lambert Lidgerwood and National.

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1—10″ Morris sand pump, Ser. No. 86864, cap. 87 cu. yds. per hr.
1—8″ Cataract dredging pump, Ser. No. 175895, cap. 2000 GPM @ 53′ head.
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Model 900 P & H Dragline. Fairbanks-Morse Diesel engine, 100′ boom, 3 yard bucket. Rebuilt.

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Loomis "Clipper" Full Crawler gas powered Blast Hole Drill. Rebuilt.

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1—9-Ton Gas, 36″ Ga., Whitcomb.
1—8-Ton 0-4-0 Vulcan, 8/G3. Ex. Cond.
2—25-Ton 0-4-0 Porter Saddle Tank Locos. Oil burners; A.S.M.E. Code, Excel. Cond.
1—50-Ton 0-6-0 Vulcan Locomotive.
1—65-Ton 2-6-0 Mogul Loco. Oil-burning.
3—70-Ton 0-6-0 Baldwin Switching Locos. ICC condition.
1—70-Ton Gas-Electric Locomotive.
1—70-Ton G.E. Battery Loco. Excellent Cond.
1—80-Ton 0-6-0 Lima Switching Loco. Excellent condition.

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1—20-ton Vulcan, standard gauge, Gasoline. Rebuilt.

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THE INDUSTRY'S RECOGNIZED AUTHORITY

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SPECIAL OFFERINGS IN SHOVELS, CRANES and DRAGLINES

1—⅜ yd. Bucyrus-Erie 10-B shovel and dragline combination with dipper bucket and dragline bucket, rebuilt.
1—⅜ yd. Bucyrus-Erie 10-B gas shovel, rebuilt.
1—⅜ yd. Bay City tractor shovel, ¾ swing, very good condition.
1—⅜ yd. Bay City Model B shovel.
1—½ yd. Model 20 Bay City shovel.
1—⅝ yd. Byers Bearcat shovel.

SPECIAL

Late Model 55 Byers Shovel and Crane Combination ⅜ yd. shovel front—½ yd. dragline bucket, crane boom and backhoe attachment—60 days guarantee.

1—⅝ yd. Byers—¾ swing.
1—⅝ yd. Byers Bearcat shovel and dragline combination.
1—⅝ yd. Insley K-10 shovel built in 1938.
1—⅜ yd. Link-Belt Speeder Model 40LS shovel and backhoe—Waukesha gas engine.
1—⅜ yd. Wilford shovel and crane combination with bucket.
1—⅜ yd. Fundum shovel.
1—½ yd. Bay City Model 20 with backhoe built in 1939.
1—½ yd. 1939 Bay City Model 25 shovel and backhoe combination.
1—½ yd. Bay City Model K crane and shovel, rebuilt.
1—½ yd. Byers Bulldog type crane.
1—⅝ yd. Byers Bulldog type shovel and backhoe.
1—½ to ⅝ yd. Model 70 Byers shovel and crane combination.
1—⅝ yd. Byers Model 70 crane with 35' boom.
1—½ yd. General shovel.
1—½ yd. General shovel and crane combination—35' boom.
1—½ yd. General shovel, backhoe with skimmer attachment.

BARGAIN

A rebuilt and guaranteed ⅝ yd. Insley shovel, backhoe and crane combination with dipper bucket and clamshell bucket, in excellent condition with 60 days guarantee. Only $5700.00.

1—½ yd. Insley shovel.
1—½ yd. Insley crane and shovel combination.
1—⅝ yd. Link-Belt Speeder with Caterpillar diesel engine, shovel crane and backhoe.
1—½ yd. Link-Belt Speeder shovel.

A 1940 LORAIN

An exceptional good buy ½ yd. Lorain Model 30 shovel and crane combination with rebuilt guarantee.

1—½ yd. Northwest No. 2 shovel.
1—½ yd. Northwest No. 2 shovel and crane combination.
1—½ yd. Northwest shovel.
1—½ yd. Osgood shovel.

A P&H MODEL 300B

Shovel front can be purchased in good condition very reasonably.

1—⅝ yd. P&H Model 200 dragline.
1—⅝ yd. P&H Model 400 dragline and crane.
1—⅝ yd. Sargent dragline with diesel engine.
1—½ yd. Unit shovel built in 1939 with a 6 cylinder gas engine.
2—¾ yd. Bay City Excavators 16B with skimmer buckets and backhoes—very reasonably price.

MODEL 40 LORAIN

Recently built—serial number in the 9100s. Shovel, crane, dragline, backhoe combination. Perfect condition—rebuilt and guaranteed.

1—⅜ yd. Koehring crane.
1—¾ yd. Koehring Model 301 shovel and backhoe combination.
1—¾ yd. Koehring 301 shovel.
1—Bay City Model 45 chain crowd, self starter, fully rebuilt.

A REAL BUY

BYERS ⅝ yd. crawler crane with 25' crane boom, backhoe attachment, skimmer scoop for $2450.00. Massachusetts location. Act quickly.

2—¾ yd. Bucyrus 10-B electric tunnel shovels.
1—¾ yd. Bucyrus Model 1030 chain crowd shovel.
1—¾ yd. Byers Bearcat.
1—¾ yd. Byers Model 10—40' crane boom.
1—¾ yd. Byers shovel and crane combination Model 80.
1—¾ yd. General crane with 35' boom—diesel engine.
1—¾ yd. General shovel and backhoe combination.
1—¾ yd. Insley shovel and crane combination—serial number in 500s.
1—¾ yd. Keystone backhoe and shovel.
1—¾ yd. Link-Belt Speeder, ⅞ yd.
1—Lorain 40 shovel, ¾ yd.

REBUILT MARION

¾ yd. Shovel and Crane Combination. Excellent condition—With Guarantee.

1—¾ yd. Mead & Morrison shovel at a bargain price.
1—¾ yd. Northwest shovel—very reasonably priced.
1—¾ yd. Northwest Model 3 crane and dragline with bucket.
3—Northwest Model 105 shovels and cranes, ¾ yd.
1—¾ yd. Osgood shovel, backhoe and crane.
1—¾ yd. Osgood shovel.
1—¾ yd. P&H shovel—very reasonably priced.
1—¾ yd. P&H with backhoe and crane combination.
2—¾ yd. P&H shovels.
1—¾ yd. P&H Model 400 shovel and crane combination.
1—¾ yd. Sargent dragline in excellent condition—reasonably priced.

1—1 yd. Bucyrus-Erie GA2, 55' boom, clamshell bucket.
1—1 yd. Bucyrus-Erie GA shovel.
1—1 yd. High-Lift GA2 Bucyrus-Erie shovel.
2—1 yd. Bucyrus-Erie GA2 shovel and crane combinations.
1—1 yd. DIESEL Bucyrus-Erie D2 shovel and dragline.
1—1 yd. Bucyrus-Erie electric tunnel shovel.
1—1 yd. Byers Model A shovel.
1—1 yd. Byers shovel and crane combination.
1—1 yd. Brownhoist crane in operating condition for $1300.00.
1—1 yd. General Invincible dragline and crane—bucket.
1—1 yd. Keystone shovel and backhoe.
1—1 yd. Koehring shovel and crane.
1—1 yd. Koehring Model 301 crane with digging bucket.
1—1 yd. Model 401 Koehring shovel and crane combination—good condition.
1—1 yd. Link-Belt crane.
1—1 yd. Lorain Model 55 shovel.
1—1 yd. Lorain Model 60 shovel and crane combination.
1—1 yd. Marion Model 37 electric shovel.

An Exceptional Good Buy in Marion Combination Model 7 serial number in the 5600s Shovel front—45' boom and 1 yd. rehandling bucket

1—1 yd. Northwest Model No. 4 shovel and crane combination.
1—1 yd. Northwest Model No. 4 dragline—60' boom.
2—Northwest Model 105 shovel and crane combinations, 1 yd.
1—1 yd. Osgood shovel and crane combination.
1—1 yd. Osgood shovel—very reasonably priced.
1—1 yd. Osgood dragline.
1—1 yd. P&H shovel and crane combination Model No. 600.
1—1 yd. P&H shovel.
1—1 yd. P&H dragline.
1—1 yd. P&H Model No. 450 shovel.
1—1¼ yd. Bucyrus-Erie gas-air shovel.
1—1¼ yd. Bucyrus-Erie gas-air dragline.
1—1¼ yd. GA2 Bucyrus-Erie shovel and crane combination.
1—1¼ yd. Byers Master shovel.
1—1¼ yd. Lima gas shovel.
1—1¼ yd. Link-Belt crane.
1—1¼ yd. Link-Belt dragline with 65' boom.
1—1¼ yd. Lorain 75 shovel.
1—1¼ yd. Lorain 75 shovel and crane combination.

SPECIAL

Two—1¼ yd. Lorain 75A shovel and crane combinations.
One—1½ yd. Lorain 75B shovel and dragline.
All three in excellent condition.

1—1¼ yd. Marion Type 36 electric shovel.
1—1¼ yd. Marion Type 450—rebuilt—55' boom.
1—DIESEL 1¼ yd. Marion with Cummins diesel engine.
1—DIESEL 1¼ yd. Marion diesel shovel with Buda diesel engine.
1—1¼ yd. Marion electric Type 460 dragline.
1—1¼ yd. Northwest Model No. 4—65' dragline boom.
1—1¼ yd. Northwest Model 5—excellent condition.
2—1¼ yd. Model 104 Northwest shovel and crane combinations.
1—1¼ yd. Osgood shovel.
1—1¼ yd. Osgood shovel and dragline combination.
1—1¼ yd. P&H shovel and crane combination—52' boom.
1—P&H dragline and crane, 1¼ yd.
1—1¼ yd. P&H No. 650 shovel.
1—1¼ yd. P&H 650 gas.
1—1¼ yd. P&H 700 shovel.
1—1¼ yd. Speeder shovel.
1—1½ yd. Northwest Model 104 shovel.
1—1½ yd. Northwest Model 6 shovel.

ECONOMY COMPANY INC. 4
NEW YORK

DRAGLINES • SHOVELS • CRANES AND OTHER ROCK PRODUCTS EQUIPMENT

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1—1½ yd. Link-Belt dragline.
1—1½ yd. Link-Belt Model K-44 dragline—60' boom.
1—1½ yd. Lorain 75B shovel and crane combination.
1—1½ yd. Lorain 75B shovel.
1—1½ yd. Lorain 77 shovel.
1—1½ yd. Marion dragline.
1—1½ yd. Marion electric shovel Model 460.
1—1½ yd. Osgood shovel.
1—1½ yd. P&H 700B shovel and crane combination.

2 yd. Shovel and Crane, 100' Boom P&H Model 650—excellent buy

2—1¾ yd. electric Bucyrus-Erie tunnel shovels.
1—2 yd. 50B Bucyrus electric shovel and dragline combination.
1—2 yd. Bucyrus-Erie Model 80B electric shovel.
1—2 yd. Marion electric shovel.
1—2 yd. Marion Model 460 electric crane.
1—2 yd. Page diesel Walking dragline.
1—DIESEL 2½ yd. Page Model 411 dragline—90' boom.
2—3 yd. Marion Model 490 electric shovels.

¾ yd. Koehring Model 301 at a bargain price.

1—4 yd. Marion electric shovel Model 125—excellent condition.
1—4 yd. Marion Type 4160 electric shovel.
1—6 yd. Marion Model 7200 electric shovel.
1—Bucyrus-Erie Monighan 5W for rent or lease only.
1—6½ yd. Bucyrus electric shovel.
1—7 yd. Bucyrus-Erie Model 175B electric shovel.
1—20 yd. Bucyrus-Erie electric tower machine.

STEAM SHOVELS AND CRANES

1—9 ton General truck cranes—rebuilt.
2—Bucyrus-Erie ¾ yd. steam shovels.
1—1 yd. Bucyrus-Erie steam shovel.
1—1 yd. Marion steam dragline.
1—1 yd. Osgood steam shovel.
1—1¼ yd. Marion Model 450 steam shovel.
1—1½ yd. Austin steam crane.
1—1½ yd. Bucyrus-Erie 35B steam shovel.
1—1½ yd. Marion Type 32 steam shovel.
1—1¾ yd. Marion Model 37 steam shovel.
1—2 yd. Bucyrus-Erie steam crane.
1—2 yd. Bucyrus-Erie 50B steam crane.
1—2 yd. Model 14B Bucyrus-Erie combination dragline and crane.
1—2 yd. Marion steam shovel.
1—2½ yd. Marion steam crane and dragline, 80' boom.

3 YD. BUCYRUS SHOVEL

One Bucyrus 80B steam shovel. 45' shovel boom, 26' dipper stick, 3 yd. dipper bucket, rock type—on crawlers. Excellent condition—a real good buy.

1—Marion Model 70—3½ yd. crawler type.
2—Bucyrus 3½ yd. Model 95C steam shovels.
1—1½ yd. Bucyrus-Erie dragline Class 24.
1—6 to 7 yd. Bucyrus-Erie Model 225 shovel with 80' boom, 54' stick, one 6 yd. and one 8 yd. dipper buckets.
1—8 yd. Bucyrus-Erie Class 230 steam dragline.
1—8 yd. Bucyrus dragline.

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12—Euclid 18 yd. Bottom Dump Trucks, built in 1941 or 1942. Ref. 201.
9—Euclid End Dump Trucks, built in 1941 or 1942. Capacity 12 cu. yd. Ref. 202.
3—20 cu. yd. Six-Wheel Maxi Model Two-Way Side Dump Trucks. Ref. 203.
20—Federal Trucks, built 1942, 17 ton carrying capacity. Ref. 204.

SPECIAL

Three 1940 diesel Euclid dump trucks of 10 yds. capacity, powered by a Cummins Model H diesel engine at a bargain price. Wire for details.

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5—Euclid Model 11FD, Rear Dump Trucks. Equipped with 200 H.P. Cummins. Ref. 206.
3—Euclid Bottom Dump Trucks, Diesel. Ref. 207.
2—Model 1KGT Euclid Bottom Dump Trucks, Diesel. Ref. 207.
3—Model AP Mack Dump Trucks, Diesel. Ref. 5315.
3—Oshkosh Tractor-Wagon Units, 14 yd. Ref. 208.
8—General Motors Diesel Dump Trucks, 1941 Model. Capacity 11 yd. bodies. Ref. 209.
2—1942 3 ton Dodge Special, equipped with Thornton Tandem Drive. Ref. 5302.
1—10 yd. Euclid Gas Truck, Waukesha Motor. Ref. 210.
3—10 to 12 yd. 1940 Euclid Diesel Bottom Dump Trucks. Ref. 210.
6—6-Wheel Titan Dump Trucks, 12 cu. yd. Ref. 211.
5—Model 3KDT Bottom Dump Euclids, Diesel. Ref. 212
5—10 yd. End Dump Euclids with new tires. Cummins Diesel powered, 2 years old. Ref. 213.
5—Euclid Bottom Dump Trac-Trucks, Diesel. Ref. 214.
10—10 yd. Euclid gas powered Bottom Dump Trucks. Ref. 215.
2—RX Chain Drive Mack Dump Trucks, 10 yd. Ref. 216.
5—Dodge Dump Trucks, 10-12 yd. bodies. Ref. 217.
3—Koehring Dumpters, 6 cu. yd., Diesel. Ref. 218.
3—Koehring Dumpters, 6 yd. Ref. 5324.
2—Dump Trucks, Chevrolet, carry 5-6 tons. Recent models. Ref. 5215.
6—Dump Trucks, 5 yd.:
1—2 ton White, 1937.
1—5 yd. Ford, 1939.
1—5 yd. GMC, 1938.
1—4 yd. Chevrolet.
1—4 yd. Ford, 1935.
1—½ ton Pickup, 1936.
Ref. 5203.
3—Koehring Dumpsters, 5 yd. capacity. Ref. 219.
2—Sterling Dump Trucks, 5 yd. dump bodies. Ref. 5316.
1—Sterling Truck, original mileage 26,000, 5 yd. Ref. 220.
2—Ree 1942 Dump Trucks, 5 yd. Ref. 221.
1—Ree 1942 Dump Truck, 5 yd. Ref. 222.
1—A. C. 5 ton Mack Dump, about 10 years old, good mechanical condition. 75% rubber. Ref. 223.
2—1935 White 702 Trucks, 5 yd. Ref. 224.
3—1940 Ford Dump Trucks, 4 yd. B. K. power brakes. Ref. 225.
1—1941 Dodge 3½ to 6 yd. truck, Heil dump body. Ref. 226.
1—Oshkosh Truck, 3½ yd. dump body. Ref. 227.
2—Dump Trucks, Dodge, 3 ton factory rating. Ref. 228.
1—White Dump Truck, 6 ton, 3½ yd. with mechanical hoist. Will sell very cheap if Gov't will allow shipment to U. S. A. Located in Canada. Ref. 229.
2—Ford 1939 Model, 3 yd. Dump Body. Ref. 230.
5—Chevrolet Dump Trucks, 1940 Model, 3 yd. Ref. 230.
1—1939 2½ Dump Truck, International. Ref. 231.
2—1939 1½ ton International Dump Trucks. Ref. 232.
1—Ford Dump Truck, 1939, 1½ ton capacity. Ref. 233.
1—1939 ½ ton Chevrolet Dump Truck. Ref. 234.
1—1½ ton Ford Dump Truck, 1942 Model.
5—1½ ton Ford Dump Trucks, 1941 Model.
4—1½ ton Ford Dump Trucks, 1939 Model.
1—2 ton Ford Dump Truck, 1940 Model, 2 speed rear end. Ref. 5298.

MISCELLANEOUS

1—Ford Dump Truck, 1940 Model. Ref. 235.
1—AB Mack Dump Truck. Very good condition. Ref. 236.

CRAWLER TYPE DUMP TRUCKS

2—Athey Bottom Dump Track-Wagons, 18 cu. yd. Ref. 238.
1—Athey Bottom Dump Track-Wagons, 18 cu. yd. Ref. 239.
5—Linn Half Crawler and pneumatic tired Trucks, 2 Diesel engines and 3 gas. Ref. 240.
1—Linn Tractor. Dumps by hydraulic hoist. Ref. 241.
2—Linn Trac-Tractors, Model 6A, Waukesha 6 cyl. gasoline engines, 100 H.P., 8 yd. hydraulic dump body. Ref. 242.
1—Western Crawler Wagon, 8 yd., 2 front wheels to steady when loading.
1—Western Crawler Wagon, 8 yd., with cab Dover Dump.
1—Euclid 8 yd. Crawler Wagon. Ref. 243.
2—Athey Wagons, 8 cu. yd. crawler, Bottom Dump. Ref. 244.
2—Athey Wagons, 8 cu. yd. crawler, Bottom Dump. Ref. 245.
8—Euclid 8 yd. Bottom Dump Crawler Wagons. Ref. 246.
2—Euclid Crawler Wagons, 8 yd. capacity. Ref. 247.
7—Austin Western Crawler Wagons, Bottom Dump, 7 cu. yds. Ref. 248.
2—Linn Trucks of 15 ton capacity. Ref. 249.
2—16 yd. Athey Crawler, 2 way Side Dump. Ref. 250.
10—16 yd. K & J Dump Cars. Ref. 251.

DUMP TRUCK BODIES

1—4 yd. Dump Body (Hercules). Ref. 252.
1—Heil 3 yd. Dump Body. Ref. 253.
7 new Dump Bodies, 1½ to 2 yds., complete with hoists. Ref. 254.
1—Gallon Gear Dump Body. Ref. 255.

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5—Super "C" Tournapulls. First class condition.
3—Model "A" Tournapulls, first class condition.
6—Model "C" Tournapulls, A-1 condition.
2—Model "C" Tournapulls with LS Scrapers, 1940 Models.

TRACTORS

2—Linn Tractors, gas motors, 1942.
2—Linn Tractors, 1941, gas motors.
1—Linn Tractor, 1942, Diesel. Ref. 257.
5—Ton White Tractor, Model 59A, 90% rubber on rear. Ref. 258.
1—No. 2244 International Gas Tractor, 10 yd. Ref. 259.
1—Dodge Tractor, 1940, 2 ton, new motor Dec., 1943. Ref. 260.

TRUCK CRANES

1—9 ton General Truck Crane, rebuilt.
2—P&H Model 150 Truck Cranes.
2—Rebuilt Meade & Morrison 10 wheeler.
3—Universal Truck Cranes, 6-8 tons.
1—7 ton Little Giant Truck Crane.
Complete list upon request.

TRAILERS

Detailed description can be obtained by writing for same.

BUCKETS

249 Buckets of various sizes.

SHOVEL FRONT

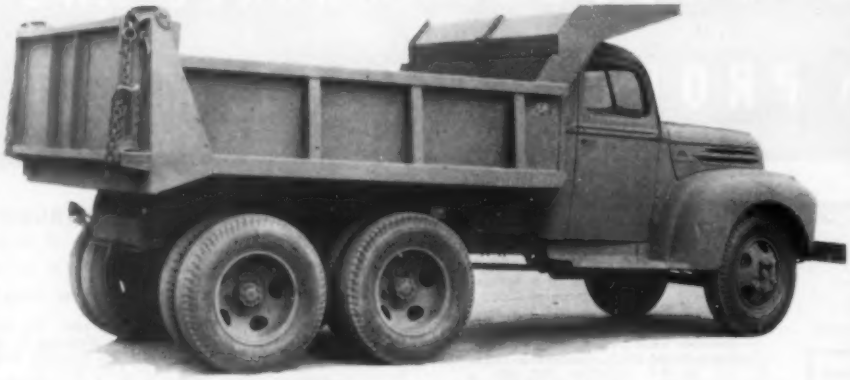
1—Shovel Front, excellent condition for ¾ yd. Bay City. If require any other shovels, fronts, backhoes, fairleads, kindly write for complete detailed information.

49-A Vanderbilt Ave., N.Y.C. Tels. MUrray Hill 4-2294 • 8292 2295 • 2296

IMMEDIATE DELIVERY

54-1942 NEW FORD DUMP TRUCKS

Tandem Drive—Completely Assembled—Ready to Run



• SPECIFICATIONS

Ford Units with Thornton Tandem Drive (Model DF 29E) Two Speed Axles (Eaton Model 1350), Booster Brakes and Reserve Tank, Garwood W12 Heavy Duty Dump Body. Box Braced. Capacity: 4 yard water level, 5 yard heap, 10' long, 6'6" wide, 8 gauge shell, Full Cab Protector, DA6 Double Acting Tailgate, F4C Garwood Hoist (Cam and Roller Type), in Steel Sub Frame. Tires 8.25 x 20, 10 ply standard all around. Heaters, Defrosters and Spotlight. Tow Cables, Heavy Duty Channel Bumpers.

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WANTED

2 or 2½ or 3 yard stripping shovel, Diesel or Electric, long reach, must be first class condition, preferably located Ohio or vicinity. D-7 Caterpillar Tractor with bulldozer or angledozer. First class condition or rebuilt and guaranteed.

EASTERN CLAY PRODUCTS, INC.
Elfort, Ohio

WANTED

Well Drill—must be in good condition.

COLUMBIA QUARRY COMPANY
1612 SYNDICATE TRUST BLDG.
ST. LOUIS, MO.

WANTED

To purchase—One heavy duty, six to eight cubic yard dragline bucket with digging teeth.

PACIFIC ROCK & GRAVEL CO.
208 West 8th St., Los Angeles 14, Calif.

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CAPITAL AND BUSINESS ABILITY AT PRESENT IDLE IS LOOKING FOR SOMETHING. Structural Engineer with some acquaintance in manufacturing, quarrying, mining and chemical industries would like to communicate with parties who have a money maker that does not require extensive and costly sales promotion. P. O. Box 468, West Palm Beach, Florida.

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PLANT MANAGER

for gypsum plant, manufacturing full line of gypsum plaster products and gypsum wallboards. Location middlewest. Please write fully regarding experience and qualifications.

• Address Box B-75, c/o Rock Products, 309 W. Jackson Blvd., Chicago 6, Ill.

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Superintendent for small lime plant located in the West. Good opportunity with permanent connection for qualified man in a plant which will continue to grow. Write Box B-73, c/o Rock Products, 309 W. Jackson Blvd., Chicago 6, Ill.

WANTED

Cement plant superintendent with engineering education and experience. Location northeastern section of United States. In applying, give education, positions held, age, marital status, salary expected, etc. Write Box B-74, Rock Products, 309 West Jackson Boulevard, Chicago 6, Illinois.

WANTED

Assistant General Superintendent for quarries located in West Virginia. Applicant should have actual quarry and crushing plant experience. Engineering education desirable, but not essential if applicant has sufficient experience and qualifications. Sales experience also desirable. In answering give detail statement of education, experience and salary required. Address Box B-76, c/o Rock Products, 309 W. Jackson Blvd., Chicago 6, Ill.

Stay at Your Battle Stations!

MANAGEMENT • LABOR

—the 5th War Loan Drive is still on.

July 29th is the last pay day in the Drive.

The U. S. Treasury has set the overall goal at $16,000,000,000 —$6,000,000,000 from individuals alone. This is the biggest sum ever asked of the American people—*and it must be raised!*

Keep fighting. The 5th War Loan is a crucial home front battle of tremendous importance to the total war effort.

Tighten up your 5th War Loan Drive organization. Step up your solicitation tempo. Drive! Drive!! Drive!!! Hit your Plant Quota's 100% mark with a bang that'll proclaim to all the world that the U. S. Home Front is solidly in back of the Fighting Front.

Need help? Need ideas? Call on the Chairman of your War Finance Committee. He's standing by.

Here's the Quota Plan:

1. Plant quotas are to be established on the basis of an *average* $100 *cash* (not maturity value) purchase per employee.
2. Regular Payroll Savings deductions made during the drive accounting period will be credited toward the plant quota.
3. Employees are expected to contribute toward raising the cash quota by buying extra 5th War Loan Bonds: 1—Outright by cash. 2—By extra installment deductions. 3—By extra installment deductions plus cash.

Example: JOHN DOE MFG. CO.—1,000 Employees

1,000 Employees x $100 . . . $100,000 Cash Quota

Regular payroll deductions during the eight weekly payroll accounting periods of June and July. 30,000

$70,000 (to be raised by sales of extra Bonds).

BACK THE ATTACK—SELL MORE THAN BEFORE

The Treasury Department acknowledges with appreciation the publication of this message by

ROCK PRODUCTS

★ ★ *This is an official U. S. Treasury advertisement—prepared under the auspices of Treasury Department and War Advertising Council.* ★ ★

It's Aggregate IN THE BIN that Counts

. . . and you can't beat a DIAMOND for putting it there!

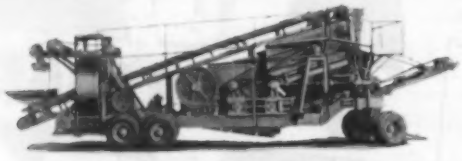
DIAMOND NO. 65 Portable Rotor-Lift Plant producing over 300 tons per hour of stabilized base on a Southwestern Airport job.

High Output at Lower Cost Per Ton Because—

NO BOTTLENECKS in a DIAMOND Plant

DIAMOND Portable Rotor-Lift Plants consistently turn out highest production of true-to-size aggregate because the whole plant is compact, not a foot of material travel is wasted—no by-passing—and every unit is of proper size for balanced output.

The main conveyor takes pit run material in a straight line through center of Rotor-Lift up to top deck of the vibrator. Crushed oversize is distributed EVENLY by the Rotor-Lift onto the main conveyor, preventing overloads on the screens or crushers. All units—vibrator, jaw crusher, roll crusher, conveyors—are rugged veterans proven by years of heavy duty service. It all adds up to smooth, uninterrupted production at low cost per ton—and at a profit for you! Ask for new Bulletin D-43-G, or see your DIAMOND Dealer.



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Quarry Plants—portable and stationary.
No. 36—Portable, rotor-lift.
No. 65—Portable, rotor-lift.
No. 95—Portable, rotor-lift.

Portable washing-screening plants.
Portable and stationary Crushers.
Vibrating, rotary and scalping Screens.
Conveyors, bins, feeders.

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Rock or Dirt

DUMPED INSTANTANEOUSLY

Time saved on the fill is time saved for every trip . . . more trips per hour . . . more production per shift. The Koehring Dumptor dumps any type material *instantaneously*. Seconds saved over mechanical dumping method speeds up every hauling and dumping job. Rock or dirt is dumped equally fast and the load is dumped clean every time . . . ready for a full load every trip.

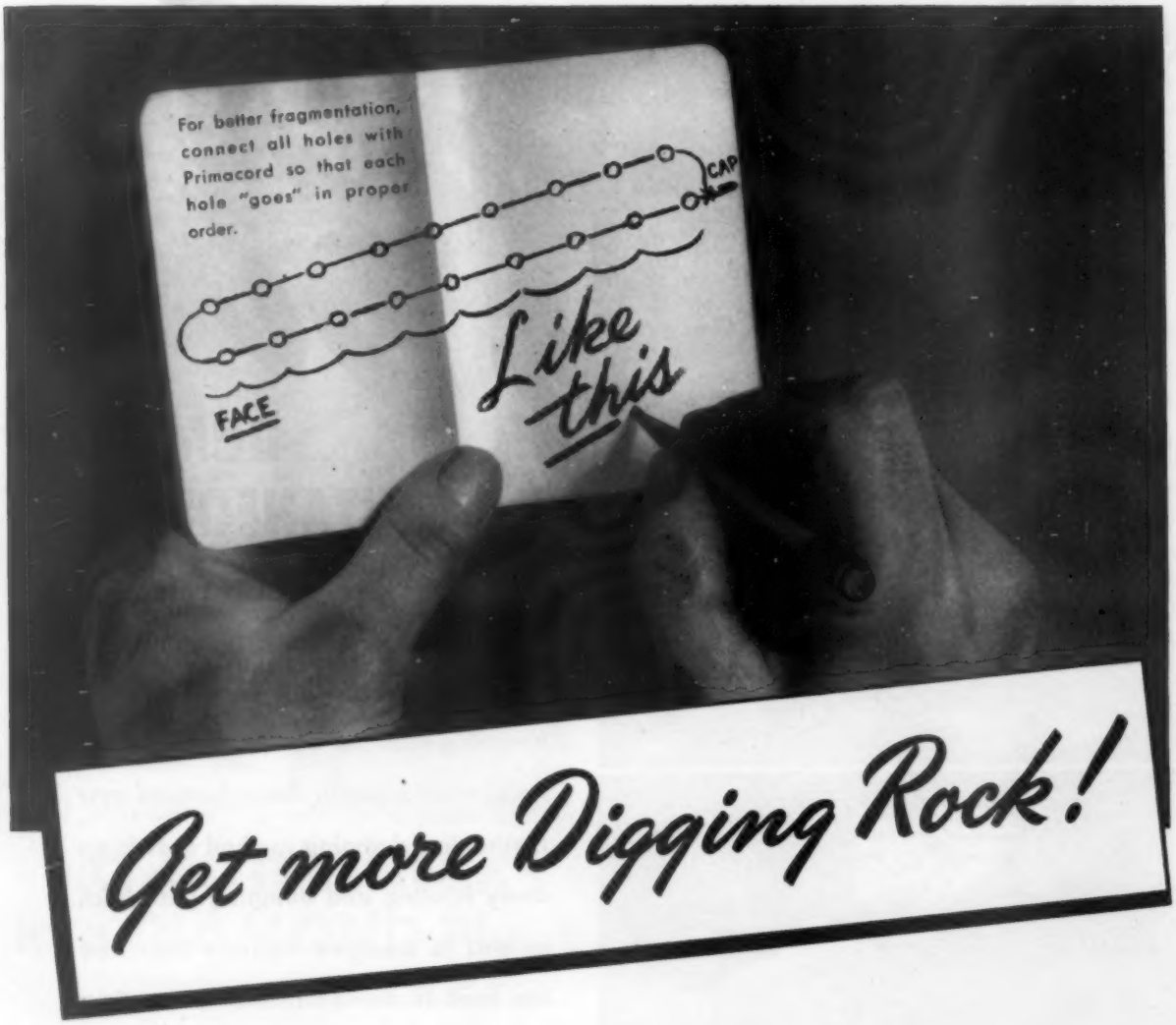
KOEHRING COMPANY
Milwaukee 10, Wisconsin

DEPEND ON YOUR KOEHRING DISTRIBUTOR to help you keep your equipment operating. Care for your Koehring equipment NOW, so it will serve you tomorrow. Koehring distributors have genuine Koehring parts. Koehring parts warehouses are at your service.

ARMY E NAVY

KOEHRING HEAVY DUTY

HEAVY-DUTY CONSTRUCTION EQUIPMENT



Get more Digging Rock!

A continuous length of Primacord, running from top to bottom of each hole, will detonate every cartridge in that hole. This is known as the "branch" line.

Each branch line extends above the top of its hole, and is connected *at right angles* to the main or "trunk" line of Primacord.

Trunk lines should connect all holes *in rotation*, so planned that the holes nearest the face will "go" first. In this way each hole can be loaded to handle its own burden, and produce proper fragmentation.

One detonator is used at the end of the trunk line, and this is applied after all loading and hook-up has been completed.

Send for the Primacord Book.

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Detonating Fuse

Manufacturers of Safety Fuse since 1836

15

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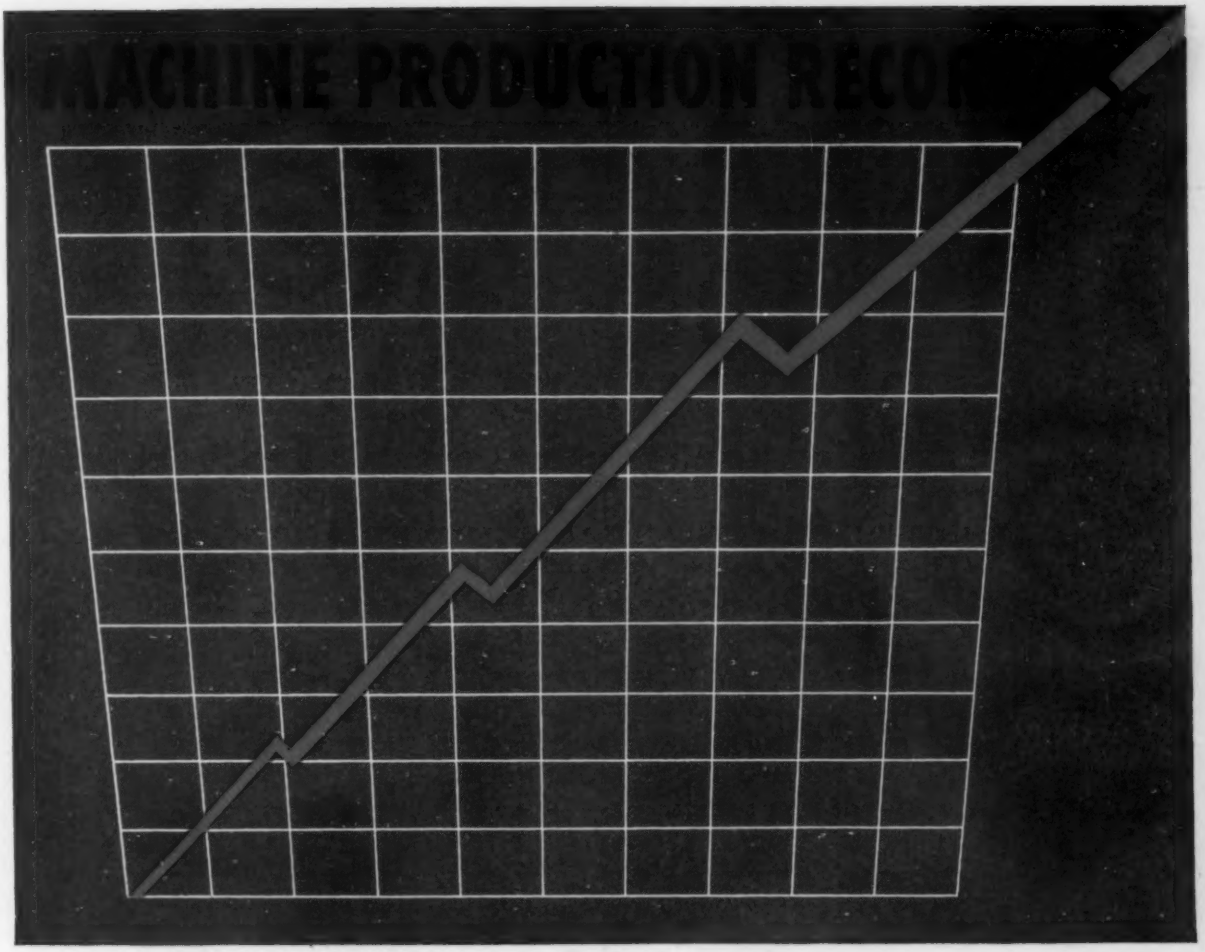

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(Yes—it increases machine production)

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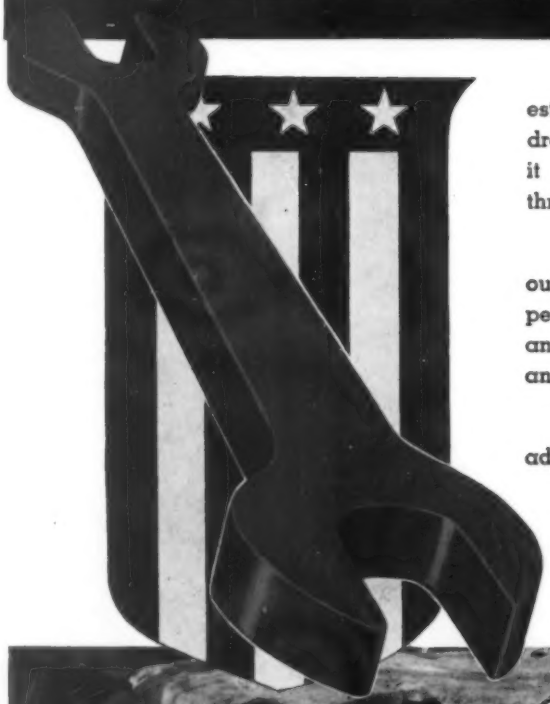
Adjust Yourself to Victory



To keep your excavator operating efficiently over the longest possible period, adjustments must be made promptly. A dragging clutch not only wears out its band too soon, but it steals power, and may result in unnecessary stresses throughout the parts functioning in the operating cycle.

Improper adjustments may not show up at once in output figures because a skillful operator can often compensate for them. In the long run, however, repair costs and delays resulting from poor adjustments will cut output and increase costs.

The time required to keep all parts of your excavator adjusted correctly will be more than repaid in decreased power consumption and lower maintenance costs.

Follow your manufacturer's recommendations for care and maintenance carefully and you will keep your excavator going at top speed for Uncle Sam.

ARMY E NAVY

Bucyrus-Erie

SOUTH MILWAUKEE, WISCONSIN, U. S. A.